The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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Developments in the Acid Industry

IN this issue we are more particularly concerned with the acid and alkali industries, the magnitude and importance of which in this country are, perhaps, not fully appreciated. For this reason it is instructive to note the rapid growth of these industries as shown by the following official figures. Forty years ago the number of works carrying on processes which came within the scope of the Alkali Works Regulation Act was rather more than 1,000. At the commencement of the war the number was 1,327, while the most recent figures available show the total to be 1,383. Even these figures do not give an adequate conception of the size of the industry, for in some instances so many as ten distinct processes are in operation on a single works; and in his last published Report the Chief Inspector under the Alkali Acts pointed to the fact that 2,241 separate processes were under the supervision of his Department. Of these there were no fewer than 241 sulphuric acid plants and 631 plants for the manufacture of sulphate and muriate of ammonia. Since the termination of the war sulphuric acid works have been gradually dropping out of the list, and there are now in operation some fifty plants fewer than in 1918. This in itself provides evidence of the manner in which the chemical industry assisted in meeting the needs which arose during the critical war years; and it is to be trusted that, as trade improves, not only will many of the plants now operating on enforced reduction of capacity be able to resume their full output, but that a proportion of the relinquished plants may again be put into commission. So far as nitric acid manufacture during the war was concerned the increase in output was remarkable. The number of works registered in 1914 was 70, but in 1916 the total had increased to 100, although, as in the case of sulphuric acid, the scale of production is now about equivalent to that of the pre-war period.

As regards sulphuric acid, chief interest within recent years has lain in the development of intensive systems in which a noteworthy attempt has been made to reduce the chamber space per lb. of sulphur consumed. From recent correspondence in THE CHEMICAL AGE it will have been noted that the packed tower plant does not altogether appear to have fulfilled expectations; but, if comparatively wide application may be taken as indicative of success, it would seem that the water-cooled chamber systems present decided advantages over the old air-cooled type. For instance, it is understood that the Mills-Packard system has been adopted by upwards of twenty undertakings in this country, and that the chamber space necessitated has been reduced to so little as 3 to 4 cubic feet per lb. of sulphur, while by a combination of intensive systems it is hoped to lower the figure still more. The significance of this progress will be understood when it is recalled that in 1885 chamber space amounted on an average to 28 cubic feet.

So far as the supply of oxides of nitrogen to sulphuric acid chambers is concerned, we have from time to time endeavoured to provide our readers with the true facts concerning the use of the ammonia converter in lieu of the time-honoured nitre pot. Last year Mr. Wilfred Wyld contributed an instructive article to our columns in which the merits of the system were referred to, and attention was drawn to the readiness with which a 90 per cent. efficiency conversion may be maintained. Elsewhere in this issue Mr. Charles Cooper returns to the subject, and has succeeded in making out a good case for the converter from the commercial point of view, even though he prefers to assume an efficiency of only 85 per cent. It is the tendency of the times for ammonia to become cheaper and for nitrates relatively

to become dearer. The problem, therefore, of ammonia converter *v.* nitre pot is one which acid manufacturers can, perhaps, afford to regard with a certain amount of apathy at the moment, but which will have to receive more serious consideration before long. It is to be trusted that Mr. Cooper's contentions may be challenged by some of those manufacturers who hold opposite views, for it is only by hearing the dispassionate opinions of both sides that the real value of the converter can be gauged. Needless to say, we shall gladly open our correspondence columns to those who may wish to present their views on the matter.

Clearing the Air

THE controversy which has been proceeding in the press on the British dyestuffs industry has already done something to clear the air. The meeting of the Corporation will probably, by the time these words reach our readers, have carried the clarification process considerably further. There are two features of the agitation which reflect but little credit on those responsible for them. Some of the questions in Parliament exhibit much more exultation over the admitted difficulties of a British enterprise than concern for its successful reconstruction and development. No good purpose would be served by searching out the motives. It is enough to say that since this attitude has apparently no interest in the success of British, but great joy in the superiority of German, industry, it need not come into any consideration of the question from the British side.

There is equally little credit in the way in which the reports of the recent "negotiations" between British and German interests have been set afloat. It is difficult to resist the impression that the story has been given as sinister and suspicious an aspect as possible—obviously, again, with the purpose not of helping British enterprise, but rather of hampering it. In the circumstances it is waste of time to try to conciliate such critics; it is franker to treat them simply as hostile witnesses. We believe, when the full story comes out, it will be found that the British side of the "negotiations" is entirely free from discredit. As we pointed out long ago, it is the British dyestuffs enterprise far more than the American that Germany fears, and the desire for an understanding with Great Britain is the best compliment that could be paid us. It was a British method to meet those responsible for any such suggestions face to face, to hear exactly what they had to say, and to make it clear to them that the development of an independent home dyestuffs industry is the only possible British policy.

With another class of critics—those who honestly desire to correct mistakes and to get on to the best possible lines for the future—the case is different. They are frankly British in their outlook and aims, however strongly they may play the part of candid friend. But when they come to practical policy we can find little except one point—the need of the best possible scientific and technical management, involving the fullest scientific and technical knowledge. The argument in favour of the highest standard of scientific efficiency is unanswerable within its own sphere. But the sphere does not cover the whole ground. This indispensable condition has to be correlated with other equally indispensable conditions, so as to secure the harmonious grouping of all in due proportion. What is wanted supremely at the top is generalship—of the kind, to take one example, which Lord Leverhulme exercises over his huge organization, not doing the departmental work himself, but selecting the right men to do it, and keeping them all in touch. What a fine combination, again, Mond and Brunner constituted—not only founding and controlling a great new industry in their own day, but building up a staff and an organisation to carry it on successfully after them. The management of a great concern like the Dyestuffs Corporation requires much more than sound scientific and technical knowledge, essential though that is; it requires equally sound commercial methods, and not least of all the instinct for handling men, colleagues and subordinates, so as to get the best out of them and to make them a real "team."

Excellent work has been done in parts. The parts now need to be made one whole. Excellent qualifications and great experience are possessed by the Corporation, but in detachment they lose half their value. In these matters isolation must give place to synthesis. Writing on the eve of the meeting and without the advantage of the facts there to be disclosed, we still think the supreme need is sound and unified collective control. Without that all else will count for little; with it there will be a solid basis on which to build, a new starting point for a determined forward policy.

Proposed Advisory Science Committee

SIR WILLIAM POPE'S proposal for the establishment of an Advisory Science Committee to the Board of Trade has the advantages of being free from risks and full of possibilities for good. The lack of a representative organisation through which chemists may approach the Government and be in turn approached—for the one is as necessary as the other—is too familiar to need comment. What is wanted is a decided move with reasonably strong backing, and the scheme should go through without much difficulty. The Prime Minister when he was at the Board of Trade, first set the precedent of Ministers in charge of bills, especially contentious ones, meeting personally representatives of the interests affected. This practice of direct consultation is an excellent safeguard against legislating in ignorance, or at the least against introducing ill-digested measures or regulations, and then having to redraft them in the light of criticism and fuller information. Even where the mistakes are corrected before the schemes actually come into operation there is waste of time which might be easily avoided; where an obstinate Minister, backed by even more obstinate departmental heads, sticks to a bad scheme the result, of course, is far worse. If a practical proposal could be laid before the Prime Minister we should be surprised if he did not see the usefulness of it and recognise its likeness to the practice he initiated with excellent results while at the Board of Trade.

As regards the principle of Sir William Pope's scheme, there should be no great difference of opinion, though one can never be quite sure nowadays what

unexpected obstacles may be invented. In matters of detail some little reconsideration may be required. In a recent issue we drew attention to the lack of communication between the Government and collective chemical interests, and suggested that a small body might be chosen from the Federal Council which would serve very well for liaison purposes. Sir William Pope's proposal is broader than this in one respect and narrower in another. He speaks of an Advisory Science Committee " to the Board of Trade." The Board of Trade, especially through its Industries and Manufactures Department, has much to do with chemistry, but it is not the only department. We should prefer to see the advisory body recognised for purposes of consultation by the Government itself, and therefore, as a matter of course, by all Government Departments. This would put it in a stronger position, and yet concede no more than such a body would be entitled to.

Hitherto we have had in mind merely a chemical consultative committee. Sir William Pope's proposal substitutes " science " for chemistry. This, of course, considerably extends the scope of the advisory body by including all scientific interests affected by legislation or departmental orders. To be representative it would need to be fairly large, but a simple system of small sub-committees might enable chemical or other special matters to be dealt with by the experts in each subject. Recommendations made first by a sub-committee of specialists and subsequently endorsed by the whole committee would certainly carry weight. If, however, the idea of covering science as a whole seems too difficult, it would be easy to substitute the simpler plan of a chemical advisory committee, which would soon find enough work to justify its existence. The important thing is to reduce one idea or the other to workable terms, and straightway put a case up to the Prime Minister.

British Fine Chemicals

THE views of Mr. C. A. Hill, chairman of the British Drug Houses, Ltd., on the present position of the fine chemical industry (reported on pp. 824-5) may be commended to those who appreciate moderation and exactness of statement combined with exceptional inside knowledge. The real distinction between parties on this subject is the distinction between short and long vision. The short-sighted critic, looking merely to the conveniences of the moment, sees defects and limitations in our fine chemical organisation which have long ago been eliminated from the German organisation. " Why bother," he seems to argue, " about an industry of our own, when we can get all we want, perhaps cheaper and better, so easily from foreign producers ! " This is precisely the attitude which lost us the lead in synthetic dyestuffs, and which would prevent us from obtaining a lead in any other direction. The other school takes account of the future even more than of the present, and is prepared to pay something now for future advantages. It is the only way to secure them. " What we want," as Mr. Hill shortly puts it, " is for those who spend their time complaining to take a wider outlook and to try to regard the whole question from the national point of view."

Points from our News Pages

Special articles are published on " Nitre Pot *v.* Ammonia Converter," by C. Cooper, M.Sc., " Phosphoric Acid, its Uses and Manufacture," by L. Carpenter, M.Sc., and " Intensive Systems of Sulphuric Acid Manufacture," by S. J. Tungay (pp. 826–832).

The inquiry under Part II. of the Safeguarding of Industries Act respecting gas mantles was continued on June 19 and 21, when evidence by importers and German makers was given (p. 835).

According to the Board of Trade Returns for May there was an increase of £130,000 in exports of chemicals (p. 838).

Our London Market Report describes the demand this week for chemical products, especially heavy chemicals, as moderately active, with values on the whole firm, and several price advances (p. 847).

According to our Scottish Market Report numerous inquiries continue to be received, but the actual number of orders booked is poor in comparison (p. 849).

Books Received

KELLY'S DIRECTORY OF MERCHANTS, MANUFACTURERS AND SHIPPERS OF THE WORLD, 1922. Two volumes. London: Kelly's Directories, Ltd. Pp. 2,530 and 1,866. 64s. post free.

TRANSACTIONS OF THE MINING INSTITUTE OF SCOTLAND. ANNUAL GENERAL MEETING. Vol. XLIII., Part I. Glasgow: The Institute. Pp. 34.

SCOURING AND MILLING. By John Schofield, B.Sc. Huddersfield: Netherwood, Dalton and Co. Pp. 231.

CATALYTIC ACTION. By K. George Falk. New York: The Chemical Catalog Co., Inc. Pp. 172.

CATALYSIS, WITH SPECIAL REFERENCE TO NEWER THEORIES OF CHEMICAL ACTION. A general discussion held by The Faraday Society. Pp. 130. 9s.

THE MELLON INSTITUTE OF INDUSTRIAL RESEARCH OF THE UNIVERSITY OF PITTSBURG. NINTH ANNUAL REPORT. By Edward R. Weidlein, Director. Pittsburg, Pennsylvania. 1922. Pp. 23.

PROTEINS AND THE THEORY OF COLLOIDAL BEHAVIOUR. By Jacques Loeb. London. McGraw-Hill Publishing Co., Ltd. Pp. 292. 15s.

The Calendar

June 27	Mineralogical Society. Papers by Dr. W. F. P. McLintock, S. R. Ennos, A. Brammall, H. F. Harwood, H. F. Collins, Professor H. Hilton, A. F. Hallimond, Dr. L. J. Spencer. 5.30 p.m.	London.
27	Third International Chemical Conference.	Lyons.
27	Royal National Physical Laboratory: Visit of Inspection 3–6 p.m.	Teddington.
28	Chemical Engineering Group and Chemical Industry Club: Joint Meeting. " The Training of the Chemical Engineer," by Dr. R. F. Ruttan. 8.15 p.m.	Hotel Cecil, London.
29	Royal Society. Papers by Sir J. J. Thomson, Sir Robert Hadfield, W. B. Dawson, Professor J. C. McLennan, M. L. Clark, J. C. Bramwell, and T. S. P. Strangeways.	London.
July 2	Société de Chimie Industrielle: Second Annual Congress.	Marseilles.
4	Society of Chemical Industry: Annual Meeting.	Glasgow.

Leaders of Chemical Industry

VI.—Mr. C. A. Hill

In connexion with the British fine chemical industry, few names have been more prominent of late than that of Mr. Charles Alexander Hill, chairman and managing director of The British Drug Houses, Ltd. The explanation is simple. He comes of a generation of chemists—enjoying, in fact, a sort of apostolic succession to the profession—has himself attained distinction and repute in the science and practice of chemistry, and combines with the academic temperament and mind a vigorous capacity for manufacturing and commercial administration. In the recent inquiries his writings have been probably more quoted than those of any other English authority, and his judgments have carried weight with both sides as those of a mind acutely penetrative and analytical, and habitually engaged in filtering out the last traces of doubt and uncertainty from its conclusions.

Mr. C. A. Hill

Born in 1874, Mr. Hill was educated at Winchester, where youth is taught that "Manners Makyth Man." He proceeded later to the School of Pharmacy, St. Thomas's Hospital, and King's College, and qualified as B.Sc. of London, F.I.C., and Ph.C. He has been a diligent original investigator, and the articles he has published from time to time on the results of his work constitute a small library, more than one number of which has been said to be good enough to make a chemist's reputation. Mr. Hill has already filled many public positions. On three occasions, 1916–17, 1917–18, 1919–20, he has been President of the British Pharmaceutical Conference. He serves, or has served, on the Councils of the Chemical Society, the Institute of Chemistry, and the Association of British Chemical Manufacturers, and was also a Vice-President of the Society of Public Analysts. For five years he held the post of Honorary Secretary to the Drug Club, and for a similar period served as President after two years as Vice-President. It would, in short, be difficult to think of any important pharmaceutical interests with which he is not associated. Finally, he is a member of the Court of the Salters' Company, with which his family has been associated for a hundred years.

But, after all, these are but bald historical details, and they convey but little of the bristling vitality of the man himself. His keen glance, obscured for a time by an accident in his student days, but now, happily, clear again, has something of an X-ray quality in it. His mind darts at points which slower brains would reach in stages, and his crisp, incisive sentences define what he wishes to say in the fewest words. Research with him is as much pleasure as business, and his own zest infects his colleagues. Competent commercial man as he has undoubtedly proved himself to be, yet essentially he remains a man of science.

His grandfather, Arthur Stephen Hill, who died in the last year of the nineteenth century at the age of ninety-seven, entered the trade in 1817, and in due course was succeeded by his son, Arthur Bowdler Hill, who attained the age of eighty-one. Some twenty years ago Mr. C. A. Hill (his elder brother having deserted chemistry for medicine) joined his father. Successive amalgamations took place at intervals until, in 1909, through Mr. Hill's efforts, Davy Hill and Hodgkinsons, Ltd., as the firm had then become, joined with Barron, Harveys and Co., and Hearon, Squire and Francis, Ltd., to form The British Drug Houses, Ltd. This amalgamation and its results Mr. Hill regards as the great work of his life so far. The concern has grown until it now includes six of the leading London firms, the youngest of which has a history extending over a century and a half.

Since the amalgamation, and especially since and during the war, the fine chemical side of the business has been greatly developed, until that side alone employs about 500 out of a total of 1,250 people. It represents a combination not merely of names but of generations of experience with the best research and the most modern commercial methods. Mr. Hill frankly admits that fine chemical production so far has proved no short cut to financial fortune. At the same time it is work of the most vital importance to the national interest.

Recent Legislation

It seemed inevitable, on our meeting Mr. Hill, to inquire first as to the Fine Chemical Industry and the legislation recently passed for safeguarding it. His reply was perfectly frank:

"So far, the Safeguarding of Industries Act has not had very much effect on the Fine Chemical Industry on account of the large importation of foreign chemicals which took place before it came into operation. It was stated in the House of Commons recently that the amount of duty collected under the Act was £140,000; which shows the amount of benefit derived up to the present to be very small. It also shows the amount of hardship caused to those supposed to be suffering under the Act to be correspondingly small.

"The simple truth is that up to the present the British Fine Chemical Industry has had very little chance. It has suffered very greatly from recent taxation. Being an infant industry, the Excess Profits Duty hit it very hard, and although the Government are now seeing the error of their ways, and are having to give back to industry, to a great extent, the money formerly taken from it, they cannot give back to us those precious years following the Armistice which have been lost for ever. They have now decided to take a shilling off the Income Tax. In this

matter the Federation of British industries is doing splendid work for industry. It is the first mouthpiece that industry as a whole has ever had, but it must not rest until the Corporation Profits Tax is abolished absolutely. All this recent taxation has had a very depressing effect on industry, and the Fine Chemical Industry, as a comparatively new development, has felt its effects severely.

Importance of a Fine Chemical Industry

"I consider," Mr. Hill continued, "that the Fine Chemical Industry is of the utmost national importance, because, although it is itself a small industry, it is so far-reaching in its effects. The industries dependent on fine chemicals are enormous in size and national importance, and they should never again be placed at the mercy of Germany or any other foreign rival. As a nation, *we want to become producers*, and not merely merchants, but most of the people who are attacking the Safeguarding of Industries Act seem to be incapable of appreciating that point of view, and the ordinary public is probably unaware that the enormous propaganda against the Act is largely fathered and financed by those who make their livelihood by the importation of German products. It is not a question of 'Free Trade' or 'Protection.' This particular matter ought to be removed altogether from the field of politics and political considerations, and should be studied entirely from the national standpoint.

"I have just been reading the views of Mr. Max Muspratt as reported in the interview published in THE CHEMICAL AGE of May 27. Speaking of the Dyestuffs Act, as a Free Trader, he agrees that 'the position in which we were before the war made some such action inevitable,' and he describes the Safeguarding of Industries Act as 'a well-meaning attempt to deal with isolated cases of national interest.' I cannot, however, follow him in his deduction that because 'the extraordinary slump in the German exchange has rendered the Act so far almost entirely futile,' therefore the Act 'might be repealed without hardship to anyone.' *Non sequitur.* What of the capital that has been sunk, the brains and energy expended, in the belief that there would be protection for a period of years? I doubt whether Mr. Muspratt in this matter voices the views of the general body of chemical manufacturers. He is a greatly and deservedly respected leader of the heavy chemical industry, and may be reminded that many a staple heavy chemical manufacture had small beginnings as a fine chemical manufacture. Mr. Max Muspratt is reaping where his grandfather sowed. The fine chemicals of to-day are the heavies of to-morrow."

The Recent Inquiries

Pressed upon the subject of the recent inquiries under the Act, in which he has been a prominent expert figure, Mr. Hill remarked:

"I think that in no country except England could it have been successfully argued that Santonin was not a fine chemical. In these inquiries, in my opinion, the attitude of mind of some of the litigants and some of the advocates, the arguments urged, and the results arrived at have brought out prominently the thoroughly unscientific characteristics of the British people. Could it have been contemplated, when the Bill was being drafted, that after it had become an Act of Parliament people would come forward and argue that a chemical substance is not a chemical merely because it occurs in a plant? Indeed, some of the arguments adduced have caused the proceedings to assume (at times) a character which would not greatly have discredited W. S. Gilbert's reputation for burlesque. For lawyers to try to tell us chemists, who have been making chemicals for generations, that Santonin is not a chemical, is like my telling a legal friend who has been practising law for twenty-five years that all the time he has really been peeling potatoes! In a word, it is not for lawyers and merchants to say what is a chemical: it is for chemists.

"The position is shortly this. The Fine Chemical Industry is, from the national point of view, quite apart from the business point of view of those of us who are engaged in it, a matter of vital national importance. All the arguments in favour of the introduction of the Safeguarding of Industries Act remain to-day in favour of its retention, but the public are quick to forget the lessons of the war and to relapse into our easy pre-war attitude. In my opinion, you cannot take the Fine Chemical Industry piece-meal: it must stand or fall as a whole. It takes a long time to train workers and to bring such complicated processes of manufacture to a state of efficiency. If you begin to lop off Santonin here and something else there, you are eating into the industry from every side. With loyal support over a term of years I do believe that the Fine Chemical Industry could be firmly established here, and so great a result is worth some very considerable sacrifice for the moment, if people could only be induced to take the long view of the matter.

A Wider Outlook Wanted

"The animosity displayed against the efforts of British manufacturers in so many quarters is thoroughly characteristic of the British people, but it is being carried distinctly too far. In America the professors and teachers in the various scientific institutions back up the efforts of the home manufacturers of fine chemicals, who are doing similar work to that which is being done here, but who have not yet gone so far. In this country many of our professors afford loyal support and exhibit that breadth of view which one would expect of them. Some of them, however, have developed a bad habit of writing to the papers, making complaints against those who are striving to open up a most important national industry. Many of these complaints are levelled at optical glass, chemical glassware, and scientific instruments, but incidentally they manage to drag in fine chemicals. In such cases fine chemical manufacturers are really bearing the brunt of attacks concerning matters over which they have no control.

"Take the case of Germany again. There the academic chemists are in close accord with the chemical manufacturers, instead of constantly abusing them and criticising their shortcomings. What we want is for those who spend their time complaining to take a wider outlook and to try to regard the whole question from the national point of view. They may then realise what people of a longer vision have already seen: that if the Fine Chemical Industry could be made to flourish in England, there would be a fertile training ground for chemists, more work for teachers, and a great stimulus to research. The whole status of the chemist would be ultimately raised; chemistry, in short, would become a truly national industry, very much to the national advantage." F. E. H.

Dr. Ruttan's Arrival

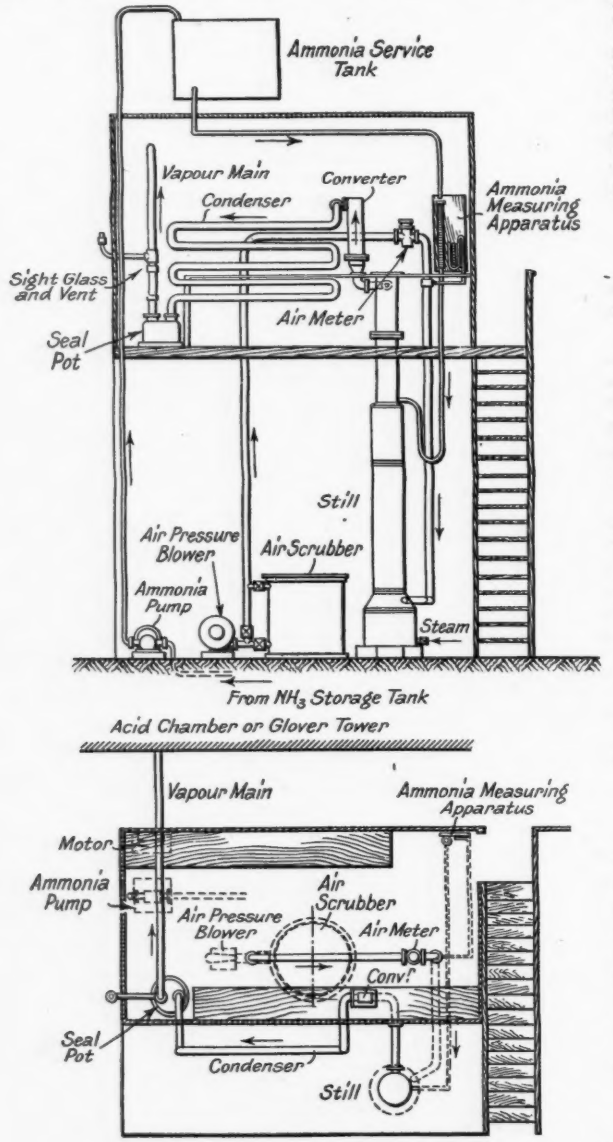
WE understand that Dr. Ruttan, the President of the Society of Chemical Industry, is now in London, and is making his headquarters the Chemical Industry Club. On Monday next he will be entertained at dinner by the members of the London Section, and a large attendance is expected. On Wednesday evening, at the Hotel Cecil, a joint meeting of the Chemical Engineering Group and the Chemical Industry Club will be held, at which Dr. Ruttan has promised an address on "The Training of a Chemical Engineer." He is reported to be in excellent health and spirits and to be looking forward with great interest to the Annual Meeting which begins in Glasgow on Tuesday week.

Nitre Pot *v.* Ammonia Converter

The Argument for the New Process

By Charles Cooper, M.Sc.

THE history of the employment of oxides of nitrogen, produced by the catalytic oxidation of ammonia, only goes back for comparatively few years, although the qualitative existence of such a reaction was known eighty years ago. Within the last twenty years the governing conditions have been studied to develop the quantitative possibilities of the reaction, but it required the stimulus of war economics to promote it into the class of everyday processes. As it is probable that few manufacturers of sulphuric acid have not at some time considered the application of the plant to their own sets and interested themselves in the various references in the journals during the last few years, it is proposed to omit most of the intermediate stages and to present for reference only the accompanying line drawing which was produced for publicity purposes in 1918, under the auspices of the Ministry of Munitions. The Munitions Inventions Department had taken up the matter, and their investigations had gone very completely into conditions to be expected in the translation of the process from the interesting experiment to the workable plant. It should be recognised, however, that a working unit had previously been evolved at the works of the Gas Light & Coke Co., Beckton,* as early as 1909, and we understand this work was only suspended because the monetary margin was at that time on the wrong side.



Ammonia Oxidation Plant: Standard M/M½ Design
(By permission of W. C. Holmes & Co., Ltd.)

The Relative Costs: Materials

There is little doubt that market relationship will sooner or later throw the balance, even now in favour of ammoniacal nitrogen, still further in the same direction.

The pair of charts on p. 829 (also produced in the days of the campaign for economy in mineral nitrate) partly explain themselves, along with the letterpress. However, we are here not only interested in the percentage on material, but will have to translate it into cash per ton of nitrate or equivalent oxides conveyed into the chambers.

Taking 1 ton of real $NaNO_3$ as a basis, 1·05 tons approximately of commercial material, and roughly an equal weight of tower acid are required. The gross cost (nitre at £15 15s., acid at £3 10s.) amounts to £20 4s. 6d. Now, on chemical equivalents 0·2 ton of NH_3 (100 per cent.) are required to make the same production, but we are assuming only 85 per cent. conversion, so that we have to supply $0{\cdot}2 \times \frac{4}{0{\cdot}85}$ ton of the 25 per cent. ammonia liquor, or 0·94 ton. This, at £14 per ton, costs at present £13 3s.

The direct saving we can at the present day state as the difference shown between these two sums, £7 1s. 6d.

Running and Capital Costs

In potting a certain amount of labour is involved, some of which is usually not paid for directly. The disposal off the works of the cake is in most localities more likely to be a source of loss than of revenue. Here we have a doubtful item. On the other hand, the labour on the ammonia oxidation plant is, of course, also incidental to other duties, and the time occupied in serving the plant with liquor from store (say once a week) divides out into a negligible fraction per day.

We will, without further justification, assume that labour costs leave a net difference that can be ignored.

The interest and maintenance we are going to put at 15 per cent. on capital cost. Silica condensers are the only really delicate article on the plant, and are unaffected chemically. The motor-driven fan and the rotary pump are not covered sufficiently by 10 per cent., but the rest of the set, consisting as it does of robust cast-iron and steelwork, helps to restore the balance. Platinum catalysts are made a separate charge below.

The writer is fully conscious of his generosity in allowing nitre pots to stand free of any capital charges, as his present object is to show that the margin is sufficient to justify

*See *Gas World*, February 23, 1918. Adam: "Oxidation of Ammonia," etc.

the stopping of existing potting plant, quite apart from new installations.

Ammonia oxidation set (less platinum), £380 at 15 per cent.=£57. Divided by 100 (tons per annum sodium nitrate, or about 6 cwt. per day), we have 11s. 6d., about, to set against our gain on materials.

The following estimated charges (per ton of nitrate) are also on the debit side :—

	s.	d.
Power for fan, say ½ h.p.	2	6
†Steam for stripping still	2	0
Loss on platinum gauzes	2	0
	6	6

With respect to platinum, excluded from the general overhead costs, it will be found that £5 will easily cover the replacement of an old gauze by a new one, all ordinary damage and loss of weight accounted for, and a margin left for accidents.

Representing this £5 as required every six months, that is, per 50 tons of nitrate, gives the above figure.

Our balance sheet stands now thus :—

	£	s.	d.		£	s.	d.
Gain on materials ..	7	1	6	Losses—			
				Increased capital charges		11	6
				Power, steam, platinum		6	6
				Balance in favour of ammonia oxidation	6	3	6
	£7	1	6		£7	1	6

The table we have just completed shows that for all practical purposes, the works costs can be compared on the basis of materials. Hence, the form in which the two charts were cast when urging the use of the plant in 1917-18.

Personal and Other Factors

In the matter of convenience and cleanliness it is generally conceded that no comparison exists. The principal objection that has to be met, in fact, is this : that it is proposed to substitute for a simple and perfectly comprehensible process of adding a measured quantity of acid to a measured weight of nitrate, a process involving the necessity of direct attention and supervision on the part of the technical staff ; a process carried out in apparatus containing expensive and delicate items appearing a little out of place amongst the wholesale scale of things in a large vitriol plant ; for the greater part of the time necessarily left in the hands of men only of experience in that scale of operations, resulting possibly in limited reliability under such circumstances.

Going away a little from this point, there is the question of flexibility according to the fluctuating requirements of the chambers ; how far this can be allowed for in instructions to comparatively unskilled men ; and, finally, whether all this particularity is worth while where nitre pots, with their undoubted readiness in coping with emergency, are already installed and understood by the operators. The writer has met with all these arguments, and at the hands of men not of conservative prejudice only, but in modern works where much more complex operations were in daily use in other departments.

Now the fact is that most of these objections disappear within a few days' experience of the job itself. The chemical staff certainly needs to take the unit under its wing, until conditions can be standardised for any reasonably expected variation in the flows through the plant. The only variation which the chemist needs directly to control is the strength of ammonia liquor supplied.

To Obtain Stability

In the lay-out of the plant nearly everything is subjected to the condition that the lowest possible disturbances only are to be permitted. For example, the air supply is, whenever feasible, derived from a direct motor-driven fan, preferably of the squirrel-cage type, operating on alternating current ; the liquor supply is from a tank set at a good elevation, so that change in the head of delivery is at a minimum ; steam for the last stripping of the liquor should be on reduced pressure, exhaust steam being very suitable if constantly available.

These safeguards being assumed, there will be a chart or set of tables showing, first, the rate of flow of liquor to be considered as representing a certain weight of nitre charged per hour (measured directly in a burette forming part of the lead to the stripping still) ; secondly, the rate of air supply to be maintained, as measured by, say, a rotary meter, but otherwise conveniently determined by a Venturi or diaphragm device. In the latter case a definite water-gauge difference is stated as equivalent to the air supply for a given liquor rate.

This device is described by Imison and Russell, in a paper communicated to the Liverpool section of the S.C.I., and published in their *Journal* of February 28, 1922. This paper, which should be consulted also for working costs, is, in fact, the fullest which the writer remembers to have noted, on the subject of ammonia oxidation in the English technical journals ; and, in fact, the most comprehensive since the original M.I.D. publication, which was not available at the time to a very wide publicity.‡

At the works from which these results are derived air is taken from a high-pressure system, and therefore a large head is available for measuring the diaphragm pressure-drop. This method of air supply is not always suitable or advisable on other works, and sometimes, therefore, the diaphragm meter will have to operate on a maximum difference, available for metering, of less than 6 in. W.G. The difficulty was got over at first by inserting a complete rotary meter, but in other cases a good measure of success has attended the use of the perforated diaphragm with a device for extending the available movement of the indicating liquid columns. There are two or three quite practicable devices, of course, for performing this magnification.

Operating the Plant

Apart from this standardisation of conditions, the chamber attendant usually cultivates in quite a short time a fairly accurate perception of the normal colour of the glow of the platinum ; the converter is located in some shaded corner, and a good-sized window of silica or mica is provided for the purpose. This faculty is in itself pretty reliable for showing if something abnormal is taking place. The robustness of the catalyst after a few days' operation is enough to make it proof against sudden extinction by clumsy handling of the controls. This same activity of the gauze makes the re-lighting a matter of seconds, of a gauze with already a day or so of work behind it. Admittedly the first few hours of a new set of gauzes are to be carefully watched, but in established circumstances, the change-over to a new gauze can be performed at a chosen time, and on converters of the latest type the replacement can be performed in a few minutes.

Note that the electric heating of the gauze is not employed at any rate on the sets made nowadays for vitriol plant ; this witnesses to the increased handiness and reliability of the plant. The lead-burner's blowpipe, with

†Charged as directly raised, although exhaust steam, if regular, is quite suitable.

‡A brief resumé of the general methods is given by W. Wyld in THE CHEMICAL AGE, 1921, 4/150 and a comparision of varying practice, by G. A. Perley, in *Chemical & Metallurgical Engineering*, January 21, 1920.

gas and air, or a hydrogen jet alone, can be depended on for lighting up.

Nor is the poisoning of the catalyst dreaded quite as much as formerly. Gauzes have been subjected to ammonia-air mixtures containing traces of sulphur compounds, pyridine and naphthalene, and have operated without perceptible loss of efficiency for long periods. It happened to the writer to discover in one works (whose name shall not appear) a complete gauze which had remained exposed, probably for weeks (the empty wrappings being judiciously locked in the office safe). At any rate, there would be an eighth of an inch of miscellaneous dust, soot and so forth to brush off. The gauze (unused) was boiled with HCl, heated to incandescence in a blowpipe, boiled again, and later it went on duty and worked to the writer's knowledge for three months, and probably longer, showing only a faint marbling of unequal activity.

A Few Generalisations

It seems to be worth while to examine the details of the controls as above, though the facile critic might point out that the length of the discussion is poor argument for the simplicity claimed. Yet the fact remains that the plant will operate in nearly every case without adjustment, until the next occasion arises for varying the feed of nitre.

One of the strongest claims for the ammonia oxidation plant remains yet to be made. That is, that the constant feed of nitrous gases is a clear advantage over the semi-intermittent feed of the nitre-pot. It can justifiably be stated, as Imison and Russell do in the paper quoted above, that this quality overrules the whole of the losses due to falling-off from full efficiency. The fact in itself is one to be admitted on probability only, and can be shown in practice.

This leads to another doubtful question from the works manager's point of view. In some cases he has attained the ideal of continuous feed with instant flexibility by running nitric acid direct into the Glover Tower. The ammonia oxidation plant here depends on the material costs to gain its advantage, and can do so on the figures already given.

Direct Use of Nitric Acid

The use of nitric acid is cheapest where it is made on the same works as the vitriol, and where low strength nitric acid can be disposed of in this way, without the trouble of working up. In such works, too, the free fumes from the nitric acid plant are exhausted into the chambers in many cases. Yet even such works have actually adopted the ammonia oxidation process in at least two cases known to the writer.

Finally, what shall we say about the availability of the materials? It will be generally admitted that the tendency of the times is for ammonia to become cheaper, and nitrates relatively dearer. Apart from the early exhaustion of the Chilian deposits, the synthetic form (Norwegian) has never dominated the market, whereas it is quite within practical possibility that within a year or two synthetic ammonia from processes of the Haber or Claude type will govern the whole scale of values in nitrogen. This being so, nitric and nitrous compounds will, so far as we can see, be derived by just this process of oxidation. It may be pointed out that the same line of thought suggests that contact-process acid should supplant chamber-acid; but we may note that the contact-process has had a fairly good chance of showing its possibilities already, and the chamber plant is still a business proposition, especially where crude forms of sulphur (spent oxide understood chiefly) have to be employed. We can see a fairly open road yet for the lead Chamber plant, and the ammonia oxidation set will help to keep it on the road by cutting down one or two of its inevitable items of cost.

Notes on Use of Charts

On the base line of Chart I find the price of 95 per cent. sodium nitrate and on the vertical line the price of 77 per cent. (140 Tw.) sulphuric acid used in "potting." If the price of sodium nitrate be followed up vertically and the price of sulphuric acid be followed along horizontally they will meet at a point on or near one of the sloping lines which will give a basis price for a quantity of sodium nitrate and sulphuric acid required for a nitrous gas production equal to that produced by one ton of 25 per cent. ammonia liquor.

If this value be transferred to the base line of Chart II and the price of 25 per cent. ammonia liquor be taken on the vertical line and the same process followed out as before, the saving effected by the use of the ammonia oxidation process will be given by the sloping line at the junction of the vertical and horizontal lines.

For example, taking the price of 95 per cent. sodium nitrate as £23 per ton and 77 per cent. (140 Tw.) sulphuric acid at £4 3s. we find from Chart I that the basis price is £31·43 (£31 9s. 8½d.), on Chart II take the basis price of £31·43 and taking ammonia liquor at say £16 17s. 6d. we find that there is a saving of 46·3 per cent. by the ammonia oxidation system over the "potting" system. The charts are based on a 15 per cent. loss in the ammonia oxidation process and no loss in the "potting" system. The charts referred to appear on the opposite page.

Norwegian Chemical Industries in 1921

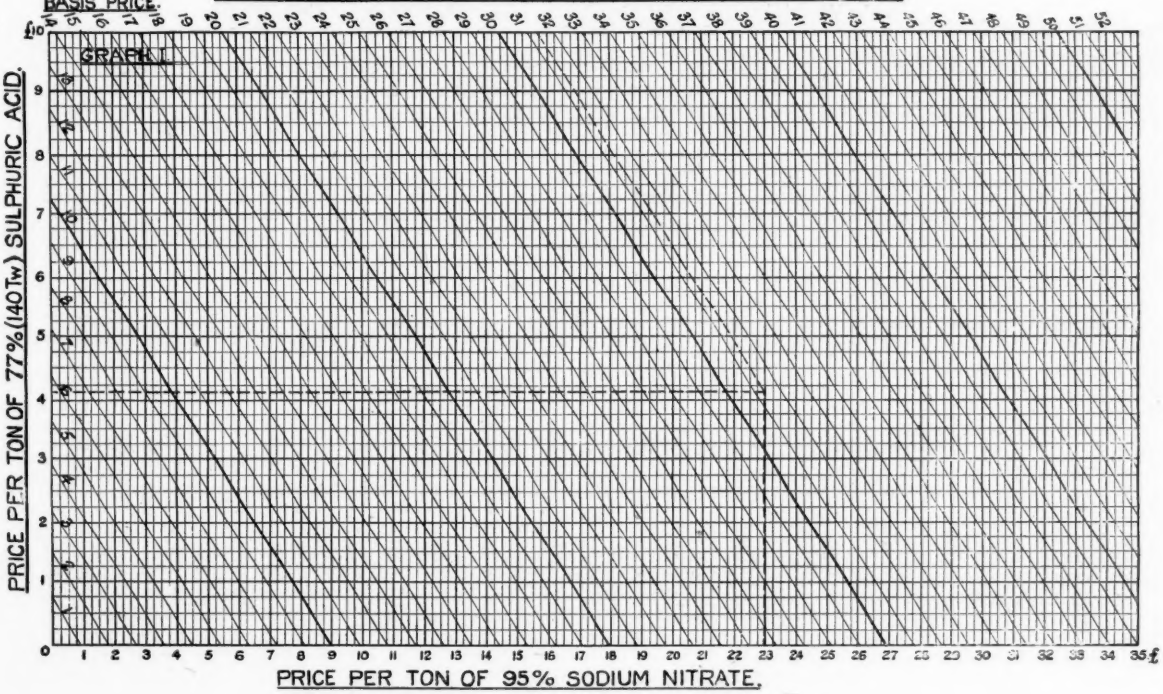
In his report on the industrial and economic conditions in Norway (H.M. Stationery Office, 2s. 3d. net), the Commercial Secretary to H.M. Legation at Christiania states that during 1921 the electro-chemical and electro-metallurgical industries suffered severely. The production of carbide is practically at a standstill owing to the small demand and the impossibility of competing with German prices, particularly in overseas markets. The production of cyanamide has ceased altogether; it is believed permanently. Although the nitrate factories have maintained a good level of production, they, too, have suffered from German competition. The factories at Rjukan are working at full capacity, but operations at Notodden are somewhat restricted owing to a shortage of water. Match factories are working on a reduced scale owing to slackness of demand.

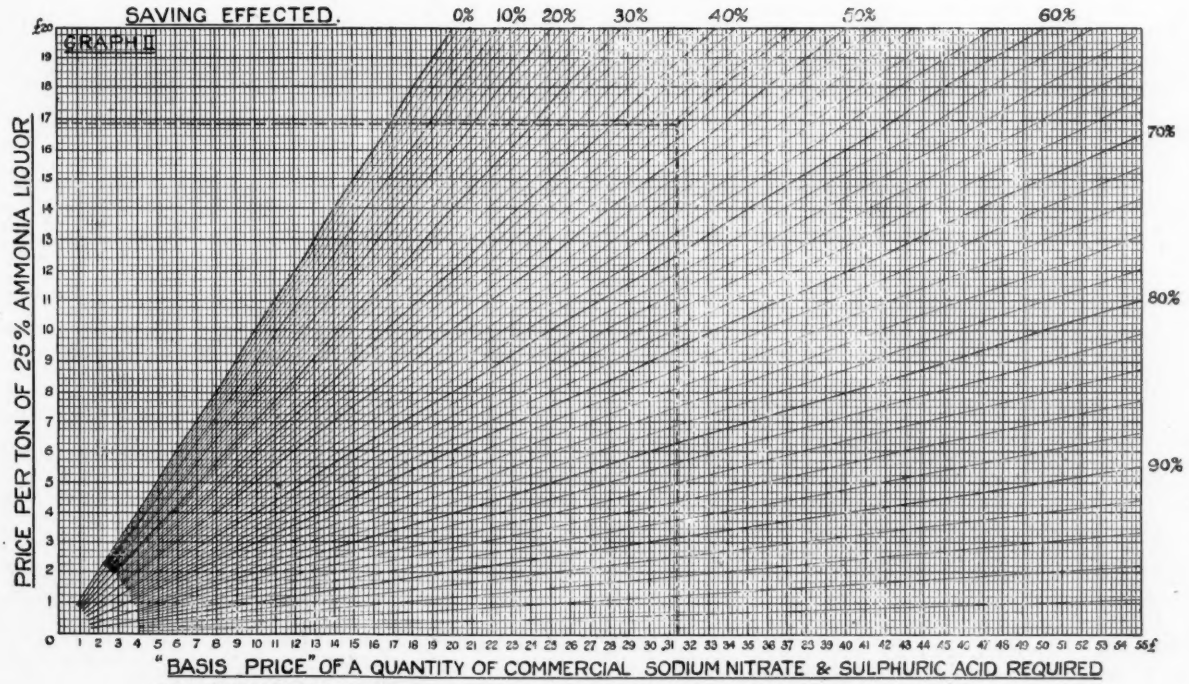
The quantities of zinc produced last year were very small, and the factories find it difficult to procure the necessary zinc concentrates. One factory exported considerable quantities of German zinc, purchased some years ago. The same factory has installed a rolling mill for the manufacture of zinc plates. Two other zinc factories have occupied themselves mainly with the redistillation of brass waste, such as shell cases and fuses, imported from Germany.

Soap factories are reported to have had a poor year owing to both home and foreign competition; they have, however, worked at nearly their full capacity. The production of coconut oil from copra has been fairly good, but it is stated that refiners of imported crude coconut oil have been unable to do much business. During the greater part of the year the production of hardened oils was restricted. The larger of the two factories engaged in this industry, is now, however, reported to be working at full capacity, chiefly on orders for the German market; the other factory has been closed.

Conditions in the mining industry have remained very difficult throughout the year, owing to absence of demand and high costs of production. The output of iron ore has been reduced to a minimum and the immediate prospects appear poor. Eight of thirteen pyrites mines have been closed down throughout the year, while the rest have operated on a greatly reduced scale, so that production has probably not exceeded 20 to 30 per cent. of normal. Stocks of pyrites still remain large. It is estimated that the quantities of pyrites exported during the year did not exceed 70,000 tons in the case of non-cupreous pyrites (delivered chiefly to Germany) and 80,000 tons in the case of cupreous pyrites (taken mainly by Sweden in fulfilment of old contracts, but also to some extent by the United Kingdom and Germany). The demand for pyrites for home consumption has been limited owing to the competition of American sulphur and depression in the cellulose industry and the superphosphate and sulphuric acid industries.

CURVES FOR ASCERTAINING THE SAVING ACCRUING FROM THE USE OF THE AMMONIA OXIDATION SYSTEM OVER THE POTTING SYSTEM WITH VARYING PRICES OF THE CHEMICALS USED.




SAVING EFFECTED.
0% 10% 20% 30% 40% 50% 60%
70%
80%
90%
GRAPH II.
PRICE PER TON OF 25% AMMONIA LIQUOR
"BASIS PRICE" OF A QUANTITY OF COMMERCIAL SODIUM NITRATE & SULPHURIC ACID REQUIRED FOR A NITROUS GAS PRODUCTION EQUAL TO THAT PRODUCED BY ONE TON OF 25% AMMONIA LIQUOR.

(By permission of W. J. Fraser & Co., Ltd., Dagenham)

Phosphoric Acid: its Uses and Manufacture

By L. Carpenter, B.Sc., A.I.C.

THE principal uses of phosphoric acid are in the food and fertiliser industries. In the former it is used as a substitute for the more expensive tartaric and citric acids in the manufacture of jellies, preserves, and soft drinks. It is also used in sugar refining for defecation and clarifying purposes; the syrup is first treated with lime and then with phosphoric acid when the impurities are precipitated with the resulting calcium phosphate.

During and since the war there has been considerable demand for acid calcium and sodium phosphates as substitutes for cream of tartar in baking. These act not merely as acidic substances to decompose the bicarbonate of soda, but also as "flour improvers," in that the phosphates catalyse the fermentation of carbohydrate during the baking process. Of these the calcium salt is used to a greater extent than the sodium salt, as the latter is hygroscopic, and for practical purposes requires to be mixed with starch or similar substance. A small amount of phosphoric acid is used for pickling and for rust-proofing iron.

In the fertiliser industry the main use of phosphoric acid is in the manufacture of "double superphosphate." Ordinary superphosphate, made by acting upon a raw phosphate with sulphuric acid, cannot be made with a higher content of water-soluble phosphate than 40-45 per cent. (expressed as tri-calcium phosphate), even when using a high grade raw phosphate such as Nauru (85-87 per cent. tri-calcium phosphate). By using phosphoric acid in place of sulphuric, however, a superphosphate containing as much as 85 per cent. and over of water-soluble phosphate can be made. It will be readily understood that the freight per unit on this highly concentrated superphosphate is much less than on ordinary superphosphate, the benefit of this being especially felt in the export trade. Even if it be undesirable to apply double superphosphate directly to the land, it can readily be mixed on the spot before use, with some cheap filler, such as sand, to break it down. Double superphosphate, however, is not as popular as it might be for many reasons. Prejudice, perhaps, is one of these; it is a fact that farmers will often insist on a 30 per cent. superphosphate rather than a 35 per cent. or 38 per cent. Another reason is the present high cost of phosphoric acid; the price has recently fallen from £57 to £40 per ton for 60 per cent. acid, but even at the latter price this represents a cost of 8s. 5d. per unit of equivalent tri-calcium phosphate.

The method of manufacture is to decompose a high grade raw phosphate with sufficient sulphuric acid to convert the whole of the phosphate present into phosphoric acid, according to the equation:

(1) $Ca_3(PO_4)_2+3H_2SO_4+6H_2O=3(CaSO_42H_2O)+2H_3PO_4$.

This is done in a den with acid of about 60 per cent. strength, and the resultant mass mixed with water in a wooden vat provided with a stirrer; or the phosphate may be treated directly in the vat with acid of about 30 per cent. strength. The resulting liquor is filtered at the press, or through a continuous filter, from the calcium sulphate, and the dilute phosphoric acid of 20-30 Tw. is then concentrated up to 100 Tw. (60 per cent. H_3PO_4) in leaden pans, heated by direct top fire from a gas producer. The strong acid which is run off is black in colour, due to particles of carbon, and is known in the works as "black acid." The gypsum remaining on the filter is washed and the washings used to dilute the sulphuric acid for the next batch; it still contains a little phosphate, and may be used as a filler for producing a low grade superphosphate from a high grade raw phosphate.

The concentration of phosphoric acid involves a number of difficulties. Hot phosphoric acid attacks a number of materials, including silica; indeed the cold, strong acid left in a beaker will etch the glass. Lead is practically the only material which can be used. Moreover, when made from mineral phosphate containing fluorides, the whole of the vapour fittings must also be made of lead, owing to the corrosive action of hydrofluoric acid upon other materials. Another difficulty lies in the formation of scale. A certain amount of calcium salts, phosphate and sulphate, are always present in solution, and these are deposited on concentration in the form of a heavy scale, necessitating frequent cleaning of the plant. Moreover, the acid, which clings to the walls and other hot surfaces of the apparatus, becomes overheated and converted into metaphosphoric acid, which forms a sticky mass and is a serious source of loss. For this reason packed towers are quite unsuitable for concentration. Open towers of the Gaillard pattern have been found fairly satisfactory, but even here the formation of scale is a source of trouble.

Recently Mr. H. E. La Bour, in America, has invented a concentrator in which the acid is heated to a temperature considerably below its boiling point in one vessel by means of steam coils, and then delivered to a spraying machine of the Ceco pattern (described in a recent issue of THE CHEMICAL AGE), in which the acid is delivered on to the centre of a rotating disc. The hot acid is sprayed into a current of air heated to the same temperature; evaporation takes place by virtue of the heat latent in the acid as it enters the spray, and is consequently at a lower temperature as it flows away. The heating chamber forms an annular vessel surrounding a central compartment into which the acid flows from the spray, and these are in communication by means of a large submerged opening. The effect of this is to keep the acid in circulation, and it is repeatedly sprayed with the result that it is gradually brought up to the required concentration and the hydrofluoric acid entirely eliminated. The process is continuous, the weak acid being continually fed into the outer vessel and strong acid delivered from the inner.*

Owing to the acid being kept well below its boiling point, and no evaporation taking place in the heating vessel, no scale formation takes place, and anything which separates in the spraying vessel is washed down as a sludge which may be caught in a sludge trap placed between the sprayer and the centre vessel. No metaphosphoric acid is formed, as the acid nowhere comes into contact with overheated surfaces. This method is a great improvement on the usual pan with top, direct firing, but a hot, sludgy liquid entails certain difficulties in handling. A process which entirely eliminated concentration would be a great improvement. Such a process is the furnace method. A mixture of raw phosphate, sand and coke, when strongly heated, is decomposed, the coke reducing the phosphoric acid set free from the phosphate, to phosphorus, according to the equation:

(2) $Ca_3(PO_4)_2+3SiO_2+5C=3CaSiO_3+2P+5CO$

The phosphorus is burned in a stream of air as it leaves the furnace, and the resulting phosphorus pentoxide condensed by Cottrell precipitation under the influence of a high tension electrical discharge, in the same way that fumes from sulphuric acid concentrators and dust from furnaces is condensed. Owing to the presence of moisture, concentrated phosphoric acid is condensed in the pipes of the high tension plant, and an acid containing 60-70 per cent. of H_3PO_4 can be obtained. This acid is dark in colour, but by filtration through decolourising charcoal can be obtained water-white.

The experiments of Waggaman and Turley of the U.S. Bureau of Soils, have shown that reducing conditions must be maintained in the furnace until a fusible slag is obtained, otherwise P_2O_5 is formed and recombines to form a pyrophosphate. The phosphorus must be oxidised outside the furnace. A temperature of 1500° C. is required, and this is most easily obtained in an electric furnace, as no oxidising gases are present and so reducing conditions are maintained. Except in districts where cheap power is available, however, this would prove uneconomical, and a gas-fired furnace with direct heating of the charge would probably be found necessary: the design of this furnace is one of the most important details to be solved in connection with the economic development of the process.

It is necessary that the furnace charge be briquetted, as otherwise fine dust is carried over. It has been found that "run-of-mine" phosphate lends itself to briquetting much more readily than washed phosphate, on account of the clay it contains. The ability to use such phosphate would cheapen the process materially. In addition the process is applicable to Redonda and other phosphates containing high percentages

* NOTE.—For further details of spray evaporation, see *Chemical and Metallurgical Engineering*, March 16th, 1921.

of iron and alumina and so being unsuitable for superphosphate manufacture. Phosphoric acid for the food industries must comply with strict standards of purity. Made in the usual way it contains arsenic, introduced in the sulphuric acid used in its manufacture, and must be de-arsenicated. By the furnace method an arsenic-free acid can be obtained at once. It will be readily seen that there are possibilities in the furnace method, which should enable phosphoric acid to be produced far more cheaply than at present. Although the heat energy for the furnace is a considerable factor, yet against this must be set the ability to use quantities of mineral phosphate hitherto considered valueless.

Intensive Systems of Sulphuric Acid Manufacture

By S. J. Tungay

I HAVE been greatly interested in the article on page 760 in THE CHEMICAL AGE of June 10, relating to intensive acid systems, and note that you conclude by stating that you would like to have more detailed practical information concerning the Duron system and other newer systems for the production of sulphuric acid.

This is undoubtedly a very interesting question at the moment, as future installations of sulphuric acid plant will undoubtedly need to be erected on the very latest principles with a view to obtaining a maximum production with the least expenditure of power and manual labour. I venture to give you below some detailed information relating to the Duron system of tower plant for the intensive production of sulphuric acid.

All tower systems formerly constructed show more or less the disadvantage of a high nitric acid consumption, as a result of imperfect working conditions or irrational construction; moreover, interruptions in working frequently happen, followed by considerable loss of nitric products.

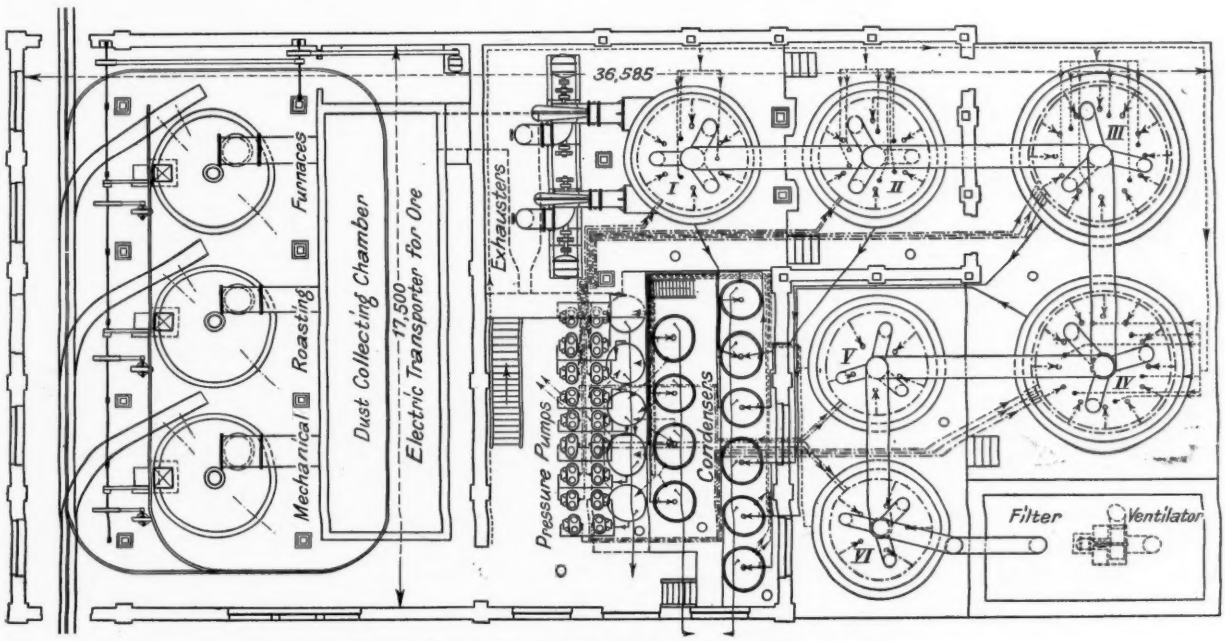
The principle of all tower systems is based on an intensive circulation of an acid relatively nitrous; however, the acid produced, if it is not to be of a bad quality and give dissatisfaction, should not contain any nitric acid. Consequently the Glover, which has to perform the denitration, has a very considerable amount of work to do in proportion to the quantity of acid.

In all these tower systems the acid circulates from one tower to another; as in the case with the Opl system, where the Tower I or Glover receives the acid to be denitrated from all the remaining towers. The second tower gets its acid from the fifth, the third from the fourth, and *vice-versa*. By means of a circulation arranged in this way, should trouble occur in any of the towers, the same is likely to be communicated immediately to the tower in question by the same acid. Consequently there is a double disturbance in working.

M. Duron claims that in the case of the Duron tower system all these interruptions are avoided, as the method of circulation adopted allows immediate and automatic adjustment of all troubles in working the process, and a finished acid which still contains nitric acid could not occur.

The Duron tower system of standard design consists of six towers, varying in shape, and arranged similar to the outline below.

Tower I brings all the acid produced to a uniform concentrated state; Tower II works practically similar to a Glover tower; Towers III and IV are those where the actual manufacture of the acid takes place; Towers V and VI are Gay-Lussac towers.



Duron Tower Plant for Sulphuric Acid Manufacture

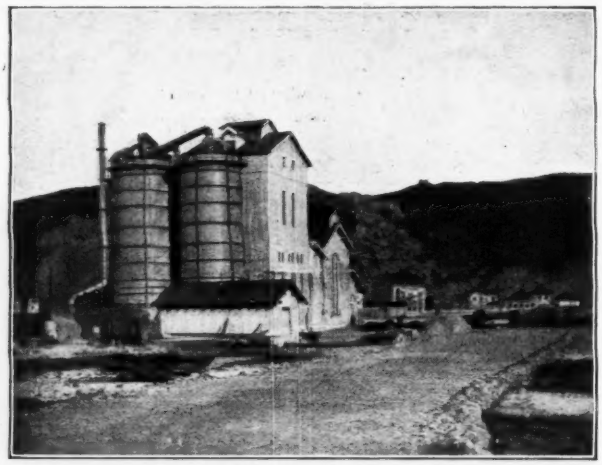
The acid during course of manufacture is lifted to the towers, without the medium of any reservoirs or tanks, by means of centrifugal pumps and endless acid elevators, and not, as in the case of some of the other tower systems, by using acid eggs, which, besides giving a very poor yield, show considerable installation costs.

The gases in the case of the Duron tower system are also spread over the whole section by means of a special system, avoiding the long and complicated pipes, which is one of the drawbacks in many other systems of tower installation; and with these short gas connections, the temperature necessary for the re-action is maintained. In addition to the working economy, this system offers a very considerable saving in the cost of installation, owing to its exceedingly compact form.

Of the six towers described, two must be protected, whilst the remaining four can be erected in the open air. All the

towers are slightly conical in form, following the ordinary factory chimney, and their stability is in consequence such that outside supports are rendered unnecessary.

It is estimated that the ground space required for making a Duron tower system for sulphuric acid is about one quarter of that required by a chamber plant having the same effective power and yield. The illustration below shows the general appearance of a Duron tower system as constructed in Spain.



General View of Duron Tower Plant

I was recently in Paris, and had an opportunity of a long conversation with M. Duron with regard to sulphuric acid, a subject in which he has specialised very considerably; and I have no doubt that anyone wishing to communicate with him at La Varenne-St.-Hilaire, near Paris, on the subject of the intensive manufacture of sulphuric acid would find that he has very considerable information at his disposal.

The following are the costs of production of sulphuric acid manufactured with the Duron tower system. These are pre-war figures given in marks in 1914, but comparison could easily be made, allowing for the present-day increase in costs or working expenses.

The figures deal with a plant having a yearly production of 12,000 to 12,500 tons of acid.

FOR ONE TON ACID UP TO 60° BÉ.

	Mks.
561,230 kg. pyrites, 48% of S., at 19/20 mk. per ton	10,775
10 kg. nitric acid, 36% Bé, at 217 mk. per ton ..	2,170
Power required for mechanical furnaces, automatic carting of the pyrites and residue, exhausters, compressing engine, pumps, electric light, etc., 1·3 h.p. per ton acid ..	1,092
Labour charges: Five workmen, two foremen, at 4 mk. per day	0.785
Repairs	0.800
Mks.	15,622
Amortisation and interest of the capital for the installation, 15%, of 250,000 mk.	3,000
General expenses, direction, laboratory, offices, etc.	0.750

	Mks.
Costs of one ton acid, 60° Bé.	19,372
Costs of one ton acid, 50° Bé.	15,497
Costs of one ton of H_2SO_4	24,796

Anti-Dumping Orders.

WITH the issue, on Wednesday, of the draft of the first Order proposed to be made under Part II of the Safeguarding of Industries Act. Among the goods affected are: Illuminating glassware (except pressed or composed of fused silica, vitreosil, or similar material). In regard to gold leaf the Committee reported that they did not find that the conditions prescribed under the Act were completely fulfilled.

New York Facilities for Traders

To the Editor of THE CHEMICAL AGE.

SIR,—His Majesty's Consul-General at New York (Mr. H. Gloster Armstrong) has written to this Department calling attention to the facilities which are now available to the representatives of United Kingdom firms visiting New York at the offices of the British Empire Chamber of Commerce in that city. The Chamber, which has recently taken new premises in the Cunard Building, 25, Broadway—one of the largest and most modern structures in the city—has arranged for the formation of a sample room where British commercial travellers can, for a moderate charge, exhibit their goods, take orders, obtain office facilities and clerical assistance, and generally make it their headquarters during their stay in New York.

The Consul-General feels that this arrangement should prove extremely useful to the representatives of British firms, enabling them to display small samples in economical and advantageous circumstances. British travellers visiting the United States with samples have in the past been greatly hampered and delayed by the necessity of negotiating for a suitable room before circularising their customers.

It is suggested that firms requiring the use of the sample room for their representative should communicate with the Chamber well in advance, at the same time furnishing a list of their American customers, to whom the Chamber would then issue official invitations to meet the representative at a fixed date. Local firms known to the Chamber as interested in the trade concerned, though not listed as customers of the firm, would also be communicated with in the hope of securing their custom. It is understood that the Chamber would also render assistance, if desired, in the issuing of circulars or in the distribution of catalogues or literature, on basis of cost. The charge for rent will be $10 per day per room, inclusive of light and heat.

If this matter is of interest to your readers any further particulars desired in regard to the accommodation or facilities provided by the Chamber can readily be obtained from the Secretary, to whom it is suggested communications should be addressed direct at 25, Old Queen Street, S.W.1.—Yours, etc.,

L. N. BARKER.
For Comptroller-General,
Department of Overseas Trade.

Failure of a Consulting Chemist

A SITTING for the public examination of Mr. Leon Maurice Hirchberg, consulting chemist, Ely Place, Holborn, London, was held at the London Bankruptcy Court, on June 16, before Mr. Registrar Francke, the debtor's statement of affairs showing ranking liabilities £1,325 and estimated net assets £1,099 (see THE CHEMICAL AGE, Vol. VI., p. 631). It appeared that he was a German subject, and came to this country in 1912. Until August, 1914, he was in employment latterly as a chemist. He was afterwards engaged in the manufacture of munitions for the Government. That, however, came to an end in November, 1918, and in the following January he began business as a consulting chemist at 85, London Wall. In June, 1919, he was joined in partnership by another person. In September of the following year, however, the partnership was dissolved, and the debtor continued the business alone until January last, when he closed it, and he had since been without regular occupation. He attributed his insolvency to the slump in trade and to heavy expenditure in connexion with his wife's illness. He added that he had been expecting to be appointed consulting chemist to a company, and the company was actually in course of formation when he contracted some of his present debts in October last. He was not possessed of any estate in Germany. No agreement had been entered into with the company to which reference had been made. He was not personally forming that company. He obtained fees from Major and Co., and firms of consulting chemists, but he denied that the firm named had paid him £2,000 per annum. The highest amount he had received was £1,600 a year. He had sued Major and Co. in respect of money which, he alleged, they owed him, and they had counterclaimed for £282 for which amount they alleged he had failed to account. He did not admit that counterclaim. The examination was concluded.

The Chemical Markets of the World

Trading Fields for Manufacturers and Merchants

We give below a further series of notes describing present conditions in actual and potential markets for British chemical products. The present instalment deals with markets, several of which are practically undeveloped. Acknowledgment is again due to the officials of the Department of Overseas Trade who have rendered valuable assistance in the compilation of these notes.

Norway

GENERALLY speaking the demand for raw materials in Norway has, during the last year or so, been small, owing to acute industrial depression. In the case of heavy chemicals the chief cause has been the reduced consumption of the paper and pulp mills which have also held large stocks. These stocks are not yet consumed, but demand is reported to have improved since the mills resumed more normal operations.

The full benefit of the improvement is not felt in this country as such supplies as are procurable from Germany are purchased there on account of their cheapness. British heavy chemicals enjoy an excellent reputation in Norway, and, were it not for the fact that the German exchange enables them to offer chemicals much below the price of those manufactured in this country, the former would, it is believed, be preferred. As regards fine chemicals, a similar situation is found. Germany can offer the chemicals at a price far below that at which they can be obtained from this country.

The following import figures may be of interest :—

	January–October 1921. Kilos.	1920. Kilos.
Soda ash	3,710,133	36,724,137
Soda, caustic	524,381	1,196,594
Potash	238,137	1,196,637
Sulphuric acid	227,528	2,674,455
Thomas phosphate	3,328,717	—
Superphosphate	3,224,420	5,976
Rock phosphate	8,037,625	32,550,589
Kainit and other potash fertilisers	7,453,767	16,923,921

Denmark

The Danish demand for heavy chemicals is not at present very large on account of the stocks which were accumulated during the war. These stocks are being absorbed, but owing to the general depression ruling in Denmark they are disappearing slowly. Competition is being experienced from Germany of such an acute nature that the Danish chemical industry suffered great losses during last year.

The consumption of fine chemicals in Denmark is fairly good for the size of the market, but serious competition is met with from those countries whose exchange is low. Of these countries the principal is again Germany. The imports of chemicals from January to December, 1921, were valued at 20,194,000 krs., while fertiliser imports for the same period totalled 60,482,000 krs.

The most satisfactory way of conducting business with both Norway and Denmark* is by appointing a separate resident agent in each of the countries. The usual type of agency is one on a commission basis, and the agent should from time to time receive visits from his principals, who should be introduced to the various buyers. Such visits bring about a more personal relationship between buyer and producer and often smooth away little difficulties and strengthen the business ties between them.

There are no obstacles to trade between this country and Norway and Denmark other than the present competition from countries with depreciated currency. The principal banks are sound and are ready to give reasonable credit to reputable concerns.

Sweden

The market for chemicals in Sweden is not large, and the imports consist principally of the raw materials required in connexion with the country's staple industries—viz., paper and wood pulp. The chief heavy chemicals imported are :—Nitrate of soda (Chile saltpetre), Glauber's salts, sodium bisulphate, calcium nitrate, raw phosphates, soda and bicarbonate of soda, Stassfurth salts, pyrites and sulphur.

Competition from Germany in the above commodities is very acute, but many varieties manufactured in Great Britain ought to find a good market when the Swedish factories are again working full time, provided that prices are competitive. At present Sweden, in common with other European countries, is suffering from a temporary economic depression. Methods of trading with Sweden are perfectly straightforward and normal, but it is imperative for the United Kingdom exporter to be represented locally by a reliable agent. The exchange presents no difficulties as it is quite stable. There is a small but regular demand for high-class pharmaceutical and medicinal products.

Finland

Finland has no basic chemical industry, and is therefore largely dependent on foreign countries for chemicals for industrial or private consumption. The principal heavy chemicals imported are those required for the paper and pulp, glass, tanning and textile industries (caustic soda, sodium sulphate, chloride of lime, aluminium sulphate, sodium carbonate and saltpetre).

Germany and the United States are active competitors in this market, but none the less a large share of the trade in drugs and chemicals goes to Great Britain and will continue to do so provided that United Kingdom firms can quote competitive prices.

There is a small and regular demand for first-class pharmaceutical products and medicinal drugs, but the major portion of this trade is at present in German and American hands.

The methods of doing business with Finland are perfectly normal, and the exchange, which is now comparatively stable, although considerably below the pre-war rate, should not cause any difficulties. The present German predominance in this market is naturally due to a large extent to the depreciated German mark, which enables German firms to underquote their foreign competitors.

Russia

Direct business with the Russian consumer of chemicals is not at present possible owing to the monopoly over the foreign trade of Russia which is exercised by the Russian Soviet Government. The latter, through its trade delegations established in certain foreign countries (including the United Kingdom), controls the flow of all goods imported from abroad, whether required for Russian industries or for private consumption. Thus, in the case of purchases of chemicals or other goods of United Kingdom manufacture, these are carried out practically entirely by the Russian Trade Delegation in London through its buying agency entitled the All-Russian Co-operative Society, Ltd., 43, Moorgate, London, E.C.2.

As is well known, Russian currency is at present valueless as a purchasing medium on the foreign market, and business with the above agency is therefore conducted on a cash basis ; business on these lines is naturally dependent on the immediate cash resources available for the purpose, so that the determining factor in the volume of business in chemicals or other goods is not the market's capacity for absorption (which is comparatively large), but Russia's capacity to pay. Although the above-mentioned concern represents the sole channel of business between the United Kingdom and Russia, so far as the bulk of purchases for the latter country is concerned, the London agency of the Russian Co-operative societies—viz., "Centrosoyuz," Hazlitt House, Southampton Buildings, Chancery Lane, W.C.—has also been permitted by the Soviet Government to make certain purchases on behalf of the co-operative societies independently of the official trade organisation referred to above, and it is possible that this agency may also be in a position to purchase certain types of chemicals.

* Norway and Denmark are dealt with together here for convenience. They should, of course, be worked as separate countries.

Poland

The chemical industry in Poland made satisfactory progress during 1921 and production increased in all branches. The import of heavy chemicals is decreasing and will be further reduced after the incorporation of Upper Silesia. Competition in pharmaceutical chemicals and dyes will also be more difficult, as Poland is beginning to produce these articles. The following notes on the state of Polish chemical industry may be of interest :—

ACIDS.—During 1921 there was an increase in the production of sulphuric acid. Certain quantities were, however, imported from Upper Silesia for the production of superphosphates. Nitric acid is produced at present in two factories.

The demands of the home market for hydrochloric acid are entirely met by local production.

The production of superphosphates during 1921 increased, but continues to be hampered by the difficulty of importing phosphates.

DYES.—This industry made certain progress during 1921 and should develop after the incorporation of Upper Silesia, as the extraction of tar products is on a much higher level there than in Poland. Upper Silesia will also be able to supply the necessary intermediates which in the past were imported almost exclusively from Germany. The local works increased their production during 1921 and are in a position to compete successfully in some articles with German and British dyes.

GLUE, ANIMAL BONES, ETC.—This industry is developing well and attempts have already been made to export glue to Great Britain.

PHARMACEUTICAL AND ALCOHOLIC.—This branch is showing signs of development and the production of different preparations began in 1921.

From the above it will be seen that Poland is either already or will be in the near future self-supporting to a large extent in the matter of a great many chemicals. Fertilisers are, however, still wanted in large quantities and a ready market exists here, provided that the difficulty of increasing German competition and the depressed state of the Polish currency can be overcome.

The methods of doing business in Poland are at present abnormal, owing to the depreciation of the Polish mark; but provided that British firms are prepared to grant credit and are careful to do business only with the old-established and reliable firms, the risks entailed are not more than in any other commercial transaction where the granting of credit is involved.

Baltic States

Although chemicals, drugs and pharmaceutical products generally figure amongst the chief imports into the Baltic States (Esthonia, Latvia and Lithuania), the market is an extremely difficult one for British exports, owing to: 1, German competition; 2, the depressed currency of these States and their lack of purchasing power; and 3, the conditions of trade. In a large number of cases German firms can offer goods at as much as 50 per cent. below British prices, and unless United Kingdom manufacturers can produce more cheaply and give extended credit, their prospects of capturing these markets are small. Business being largely retail, quick delivery is essential, and the firm which has stocks available locally scores in every case.

Before the war, all these States were producers to a limited extent of certain classes of chemicals, but owing either to destruction of works or other factors caused by the war, few factories are yet working to anything like their full capacity.

A Manufacturing Chemist's Failure

THE public examination of Mr. George Steven, trading as G. Steven and Co., 118, Chorlton Road, Old Trafford, Lancashire, manufacturing chemist, was held recently at the Court House, Encombe Place, Salford. The statement of affairs showed ranking liabilities of £5,524, while the assets were estimated to realise £4,469, from which preferential claims of £1,506 had to be deducted (*See* THE CHEMICAL AGE, Vol. VI, p. 711.) It appeared that the debtor started business in March, 1918, as a manufacturing pharmaceutical chemist at his present address. He borrowed about £9,561 from one of his principal customers, which he had repaid by August. After he had been questioned with reference to some of his transactions, the examination was closed.

Brunner, Mond & Co.

Mr. Roscoe Brunner on Trade Prospects

PRESIDING at the annual meeting of Brunner, Mond and Co., Ltd., held on June 16, at the Exchange Station Hotel, Liverpool, Mr. Roscoe Brunner, dealing with the accounts, said the balance sheet disclosed a very strong position, greater reserves and an excess of assets over current liabilities of 17¼ millions, against a capital of less than 14 millions. The gross profit after deducting the depreciation of £150,000, as last year, actually showed an increase, but since in last year's accounts those gross profits had borne a writing-off of £264,000 for depreciation in stocks, and this year the writing down of one quarter of a million had been done out of reserves the real trading profit was considerably less than last year's. In a year when a great many companies had made such losses as had wiped out the whole of their reserves, to have made a profit at all was a great achievement.

Progress at Billingham

The board were quite satisfied with their patent processes although they were at all times endeavouring to improve them. They were in no way anxious, and so satisfied were they with their last patent process that the work of erection of the plant of Synthetic Ammonia and Nitrates, Ltd., at Billingham, had been proceeding as fast as possible for many months. It was, of course, considerably interfered with by the engineering lock-out, now happily over, and they hoped to have the plant running early next year, not, indeed, in time to reap any benefits during the current financial year, but almost certainly in time to benefit the company in the succeeding financial year.

As to the ammonia soda process, though that did not now depend much upon patents, they had been at work slowly for a considerable number of months past in the erection of the Wallerscote Works. Latterly they had speeded up that work, and, as they believed prices had reached economic levels, they had given further orders for buildings and plant to be erected at those works, and they thought they would be in time to meet the increased demand when it arrived.

Referring to the litigation in which the company had been involved regarding the tolls levied by the Manchester Ship Canal Co., Mr. Brunner said he did not approve of the criticisms made by certain Judges regarding the heavy costs of the proceedings.

Continuing, he said the board were very pleased to report that the time-keeping on the part of their employees was the best on record, and that no fewer than 99·1 per cent. of their men had earned their week's holiday. Incidentally the chemical trade employers, who were the first as an organised trade to follow the company's example and grant a week's holiday, had been trying, at the Joint Industrial Council of that trade, to induce the leaders who represented the men on that council to agree to stiffen up the conditions under which the holiday was earned to their standard of two day's lost time in the year without reasonable excuse. He could not understand their attitude in refusing to agree, since good time-keeping was good for the men, good for the employer, and no less good for the trade union, because a man in receipt of steady wages was more likely to become and to remain a member.

Alluding to the unveiling of the statue of the late Sir John Brunner (*See* THE CHEMICAL AGE, Vol. VI, p. 811) the chairman said the memorial stood on a very fine site on the road which would eventually connect the Winnington and Wallerscote Works, and was not far from the statue of Dr. Mond.

The Trade Outlook

In conclusion Mr. Brunner said that trade was undoubtedly improving, and, as he had said before, they believed that a slow improvement was better than a quick one, for the reason that it was not so likely to be followed by a rapid decline. In the past they had statistics so reliable that they could, about half-way through the year, make an accurate estimate of their "make" for the year; their costs and their profits, to within a few tons of the make and to within a few pounds of the profits. Nowadays, data was entirely lacking. The future could not be said to be bright, nor could it be said to be dark, but as the Air Service reports had it, "visibility was poor." They hoped and believed that the future had better prospects in store for the world generally and for themselves in particular.

Safeguarding of Industries Act: Part II

Second Inquiry Regarding Gas Mantles

THE hearing of evidence in connexion with the application of the Incandescent Gas Mantle Manufacturers' Association for the imposition of an import duty upon gas mantles imported from Germany was resumed on Monday, June 19. The previous proceedings were reported in THE CHEMICAL AGE of June 17.

Evidence by Gas Mantle Importers

Mr. GEORGE HANDS (proprietor of G. Hands and Co., lighting and heating experts) said that during the war it was impossible for him to do successful business in gas mantles owing to the inferior quality of those produced by the English makers with whom he dealt. He had not bought any German mantles since the war at prices lower than Convention prices; in fact, the majority of imports had been at higher prices. The actual cost of obtaining mantles in England was 3s. per gross above the declared value. The bulk of the mantles imported during 1921 were at 46s. 2½d. per gross, the German Convention price. In his experience as an importer, he had no reason to believe that any considerable quantity of mantles of ordinary quality had been imported below this price. The average price at which he purchased mantles from Germany before the war was 20s. per gross for C upright, and 26s. for inverted. The witness gave prices at which he had bought from English manufacturers from 1915 to 1920, and expressed the view that the British Mantle Manufacturers' Association had taken advantage of the fact that there was no competition to impose a fancy price upon the article, out of all proportion to the real cost of production. He was the proprietor of a trade mark called "White Light," and there was no doubt that his customers for these goods were well aware that the mantles were German made. He was strongly of the view that if proper purchases of materials were made, and the factories were economically worked, English mantles could be made at a price very considerably below 52s. 9d. per gross. The effect of the combine of the English Mantle Manufacturers' Association, which it was alleged controlled 95 per cent. of the output of England, had been to keep prices at a figure totally inconsistent with the true value of the article, and only reasonable competition would insure that the consumer obtained a reasonable article at a reasonable price.

Mr. E. A. WOOD (proprietor of E. A. Wood, of Birmingham and Glasgow) agreed with the previous witness that the figure of 52s. 9d. per gross, given by the complainants as the present cost of production, was grossly exaggerated. Before the war good English mantles could be purchased at from 12s. to 15s. per gross, and the manufacturers made a reasonable profit. At the present time, having regard to the present costs of labour and materials, he was of opinion that the cost of production should not exceed 30s. per gross. The effect of the combine was to keep up prices. When the English manufacturers had no competition they produced a very inferior mantle at a price out of all proportion to its cost. The imposition of a tax would do more harm to the community at large than it would benefit a few individuals. It was generally agreed in the trade that the gas mantle trade was a declining one, the future being in electricity for lighting and gas for heating and cooking.

Mr. A. C. EBERHARDT (director of Lotz, Abbott and Co., Ltd., importers and agents) gave the price of German-made mantles before the war as from 11s. 3d. per gross. English mantles were sold at about the same price, and there was a good deal of competition, but pre-war German mantles were of better quality than some of the mantles made in England. During the war his firm had bought mantles from Holland at about 24s. per gross, free delivered. He gave prices at which German mantles had been quoted by his firm during 1921 and 1922, showing a great difference in the 1922 prices as compared with 1921. That was caused by the cutting of prices by English manufacturers, for which, in his opinion, there was no necessity, and German manufacturers reduced their prices accordingly. The witness corroborated the evidence given by previous witnesses.

Mr. THOMAS HARRIS (managing director of Albert Lee and Co., Ltd., importers, distributors and manufacturers of articles for the lighting trade) supported the previous evidence. Before the war, generally speaking, there was very little difference in the price of the German and English mantles, and it was always hard work to take orders for German mantles against English makers. The figure of 21s. 1d. per gross as the pre-war production cost of mantles in England was most extravagant. He had previously been in the service of Falk, Stadelman and Co., Ltd. His present firm had not imported one gross of mantles from Germany since the war at prices below the Convention price, which was 34s. 6d. (free London), since March 1 last. In his opinion, the British Mantle Manufacturers' Association was formed for the purpose of keeping up prices, and it was only the competition of importers of foreign mantles that kept the prices down to a reasonable level.

Mr. A. J. H. SHAY (partner of Keens, Shay, Keens and Co., incorporated accountants) gave evidence with regard to costs of production here and in Germany, and claimed that English concerns were either over-capitalised or they failed to make adequate use of their undertakings.

German Manufacturers' Case

The Committee then adjourned until Wednesday, when evidence was given on behalf of German manufacturers. Heinrich Zeigler, a director of the Auerlicht Gesellschaft, of Berlin, said that company produced 45 per cent. of the gas mantles manufactured in Germany, and before the war the company owned the Earlsfield Works, and controlled the English Welsbach Co. The cost of production in Germany was rising rapidly. The present cost price per mantle in Germany was 8.50 marks, against the pre-war price of 8½ pfs. It was quite clear in Germany that the cost of living was rising much more rapidly than the depreciation in the mark. As regards the cost of production in England, the witness said his company would be prepared to take over the Earlsfield Works at a reasonable valuation, to guarantee to produce upright and inverted mantles of good quality for sale to the wholesale trade in England at 34s. per gross, and to employ none but English labour in the factory, and materials bought in England. He was quite satisfied that this would leave a handsome profit for the manufacturers.

Evidence in opposition to the application was also given by Mr. S. S. Ogilvie, joint manager of the National Gas Council of Great Britain and Ireland, who said that his organisation represented about 90 per cent. of the total makers of gas in the United Kingdom, and a capital of £135,000,000. Competition with electricity was strong, and it was essential to the interests of the industry that gas lighting should be as cheap as possible.

The inquiry was closed.

Optical and Scientific Instruments

Giving evidence before the committee dealing with optical instruments under Part II of the Safeguarding of Industries Act on June 19, Major A. G. Church, D.S.O., General Secretary of the National Union of Scientific Workers, said that owing to information supplied by professors of science in various universities, and letters to the scientific and general Press, voicing a general complaint that the effect of the Safeguarding of Industries Act, the Dyestuffs Act, and the German Reparation (Recovery) Act had been to increase the cost of research, to delay research, and in some cases to prevent research, and generally to restrict the laboratory work of students, the National Union of Scientific Workers and the British Medical Association appointed a joint committee to investigate the complaints already received, to collect further evidence, and to take such action as was deemed desirable to remove the disabilities under which research and other teaching institutions laboured. This joint committee decided to circularise all heads of scientific institutions and medical schools, asking for detailed particulars of their complaints.

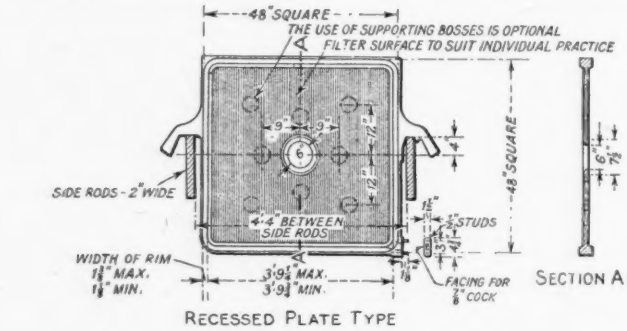
A large number of replies had been received, and the general tenour of them was as follows: (1) GLASSWARE, ETC.—Supply and quality has improved, but much of it is still imperfect. Porcelain ware often explodes when heated; glass apparatus

is not properly annealed, not uniform in character, and often the wrong shape. Large Dewar vessels, which are urgently required, are unobtainable in this country. Large separating funnels are also unobtainable. (2) BRITISH SCIENTIFIC INSTRUMENTS.—No great difficulty experienced in obtaining the commoner types of instruments, such as microscopes, balances, electrical instruments, etc., though quality not uniform. Great difficulty in obtaining the more uncommon instruments for special purposes, *e.g.*, polarimeters, polariscopes. (3) CUSTOMS DELAYS, ETC.—Very considerable delays experienced. From one to two months is the usual time quoted by which goods have been held up in this country after arrival. So great is the uncertainty in release from the customs that valuable time is being spent in preparing small quantities of raw research material, which would otherwise be spent on the research itself. Filling up forms in duplicate at the General Post Office for small parcels of goods. Also the queue habit at the General Post Office. (4) INCREASE OF COST.—Difficult to give figures of increased running costs directly attributable to the Act. Cost of providing materials, chemicals, apparatus and instruments has increased seriously, and impose hardships upon students particularly, whose fees have also been doubled recently. (5) ST. BARTHOLOMEW'S HOSPITAL MEDICAL SCHOOL.—Research on the viscosity of gases delayed twelve months by difficulties under (2). Chemical research delayed owing to difficulties in obtaining chemicals of sufficient purity. UNIVERSITY COLLEGE.—Research on "alkaloid aconitine" abandoned owing to excessively increased cost. BIRKBECK COLLEGE.—Research abandoned or delayed owing to cost of hydroxylanine, hydrochloride, and difficulty in obtaining chloro-, bromo- and nitrobenzaldehyde. ROTHAMSTED EXPERIMENTAL STATION.—Research involving use of special apparatus for michrochemical analysis abandoned owing to vastly increased cost. ENGINEERING LABORATORY, OXFORD.—Research for Food Investigation Board delayed six months by difficulty in getting large Dewar vacuum flask. ROYAL HOLLOWAY COLLEGE.—Practically all research greatly hindered by necessity of preparing compounds which could formerly be bought, and the import of materials takes so long that generally it is impracticable to wait for their arrival. It is estimated that research students spend one-third to one-half of their time preparing compounds which could formerly be bought. FINSBURY TECHNICAL COLLEGE.—Certain research work indefinitely hindered because a spectrograph has had to be made, a long process, in view of their high cost. UNIVERSITY COLLEGE, DUNDEE.—Chemical research abandoned owing to increased cost. ROYAL TECHNICAL COLLEGE, GLASGOW.—Certain organic chemicals which are obtained through British firms have been found to be impure. In great majority of cases must go abroad for them, and this hampers work owing to customs delays. VICTORIA UNIVERSITY OF MANCHESTER, MEDICAL FACULTY.—Expenses attending some of the research work limited amount of work done.

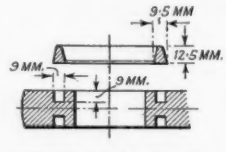
The above summary showed conclusively, said Major Church, that research and teaching institutions considered that they were being badly treated under the Act. From the general trend of the opinions expressed it was quite clear that the Act was hampering research by increasing costs, causing time to be wasted on preparation of materials which would more profitably be spent on research, and causing work to be spoilt owing to the restrictions put upon importation of glass and other laboratory ware of the requisite standard of quality. The cost of materials fell largely upon the individual research workers, and the more enterprising the research worker, the more he would pay, although his work was directed towards increasing this country's store of knowledge, and not for his own immediate material advantage. In conclusion, Major Church said it was not claimed that key industries should not be fostered; but merely that the Safeguarding of Industries Act, as it was at present framed and being operated, was hindering and hampering those very activities of the nation which were vital to its industrial supremacy and its security.

Standardisation of Filter-Press Plates

WE give below the final drawings for the proposed standard 48 in. square filter-press plates and frames prepared by the joint committee of the Association of British Chemical Manufacturers and the British Chemical Plant Manufacturers' Association. The joint committee's notes on the designs appeared in THE CHEMICAL AGE of June 17:—


48" SQUARE
THE USE OF SUPPORTING BOSSES IS OPTIONAL
FILTER SURFACE TO SUIT INDIVIDUAL PRACTICE
SIDE RODS - 2" WIDE
4·4" BETWEEN SIDE RODS
WIDTH OF RIM 1⅞" MAX. 1⅝" MIN.
3'9¾" MAX. 3'9½" MIN.
1½" STUDS
FACING FOR ⅞" COCK
SECTION A-A

RECESSED PLATE TYPE



PROPOSED STAND SIZES OF INSERTED RUBBER JOINT RINGS ON EXTERNAL LUGS. (SECTION OF RINGS THE SAME FOR ALL SIZES.)

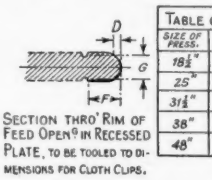
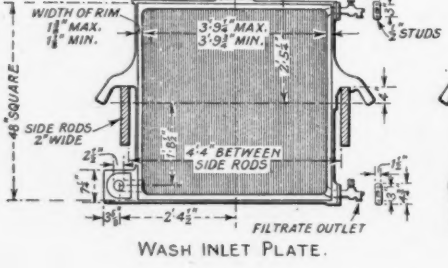


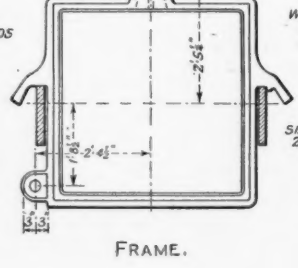
TABLE OF DIMENSIONS.			
SIZE OF PRESS.	D	F	G
18½"	9/16"	1"	5/8"
25"	3/32"	1"	3/4"
31½"	3/32"	1"	3/4"
38"	1/4"	1"	7/8"
48"	9/32"	1¼"	1"

SECTION THRO' RIM OF FEED OPEN^{G} IN RECESSED PLATE, TO BE TOOLED TO DIMENSIONS FOR CLOTH CLIPS.

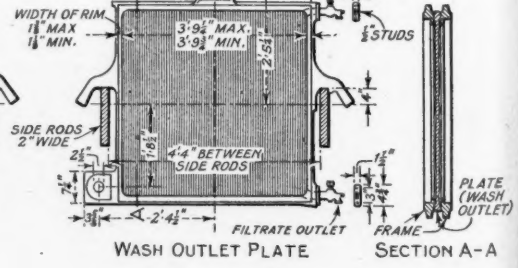
CLIP FITTED ON TOOLED RIM.



WASH INLET PLATE.



FRAME.



WASH OUTLET PLATE SECTION A-A

Exhibition of Fine Chemicals

Progress of the British Industry

In the offices of the National Federation of Iron and Steel Manufacturers, Caxton House, Westminster, there was held on Tuesday, Wednesday and Thursday a private exhibition, arranged specially for Members of Parliament, illustrating by actual examples the application both in general and in particular of the British fine chemical industry to the needs of the State. At the present time over two thousand fine chemicals are being made in Great Britain, and of this number the most interesting and important types were represented. The immediate bearing which the fine chemical industry has on industrial and social life was reflected by a chart on the north wall of the exhibition hall in eight distinct ways, each of which was supported by a practical exhibit on the adjoining tables.

Tropical medicine offers a vast field for British chemical research, and a direct instance of the practical and beneficial results won by such research was here supplied by an exhibit of chaulmoogra oil, now being used with considerable success in the treatment of leprosy and consumption, both in England and abroad.

Stainless cutlery is a popular example of the value of fine chemicals in general industry, and the spreading demand for rustless steel is one of the strongest arguments that could be advanced in support of the industry's development. The rare earths, such as tungsten, vanadium and molybdenum, which form the basis of the gas mantle, hardened tool, armour and motor-car axle exhibits, are obtainable from their ores only by the application of fine chemicals.

The years following the war have seen a phenomenal increase in Great Britain's output of photographic chemicals, and though in 1914 we were wholly dependent on Germany for a great many fine chemicals, to-day metol developer—which is essential to all "X" ray surgical work—amidol, silver nitrate, etc., are produced by British manufacturers in the requisite quantities and at prices which favour the consumer. The Shackleton expedition is completely furnished with photographic chemicals from British laboratories.

A typical instance of the close application of the fine chemical industry to everyday life was provided by the flavourings and perfumes exhibits. A bottle labelled anisic aldehyde contained a synthetic perfume with a strong heliotrope odour. The by-product of this perfume is the cheapest and most efficient tanning liquor obtainable. A parallel example is salicylic acid—used in the preparation of dentifrice, embrocation, aspirin, dye, and preservatives for strawberry jam. Yet a third example is vanillin, an important synthetic fine chemical by-product of the gas industry, which is used in the preparation of biscuits, confectionery and chocolates. Saccharin, too, is a fine chemical product of the first importance, especially in war.

A great proportion of the chemicals exhibited were not manufactured in this country before the war, and much of our unpreparedness for war may be directly traced to that fact. The British fine chemical industry is now, however, well established, and there is every prospect that after a few years it will be in a position successfully to combat foreign competition. That it should be supported until it attains that position is vitally essential, as Sir William J. Pope points out, "not only in the interests of British trade, but also in the interests of the welfare of the Empire as a whole." Around the walls were exhibited such slogans as "The Next War will be a Chemical War" and "Many of the Fine Chemicals of this Generation will become the Heavy Chemicals of the Next."

The Chemists' Exhibition

Interesting Display at Westminster

The twenty-third annual Chemists' Exhibition, organised by *The British and Colonial Pharmacist*, was held at the Central Hall, Westminster, London, from Monday to Friday.

W. J. Bush and Co., Ltd., of Ash Grove, Hackney, London, were showing salicylic acid, sodium salicylate, methyl and amyl salicylates, aspirin, spasmodin and spasmine, vanillin, terpineol, heliotropine, alpha ionine, methyl acetophenone, benzyl acetate, iso-eugenol, phenyl ethyl alcohol, linalyl acetate, heptine, methyl carbonate, etc., many of which have only recently been manufactured successfully in this country. There were some interesting exhibits of essential oils drawn at the company's works, while the perfumes of Potter and Moore and Buisson Frères, of which Messrs. Bush are the proprietors, figured prominently on an attractively arranged stand.

The stand of the United Glass Bottle Manufacturers, Ltd., was an object lesson in the advances made by the glass bottle industry in this country. Attractive in appearance and of distinctive design, a very large variety of bottles and jars was shown. Many of these bottles were made on the Owens automatic machines.

Novel rotary tablet making machines were in operation at the stand of Thompson and Capper, Ltd., of Manesty Buildings, College Lane, Liverpool. Built on an entirely new principle, these machines, which are very simple in operation, are claimed to be capable of making up to 1,200 tablets per minute. A safety weight cushions each compression and relieves the machine from all shocks and undue strain. Adjustments for weight and hardness can be made by hand while the machine is running. The small size machine is used chiefly for ordinary pharmaceutical tablets, and the larger one, in addition to making tablets up to 1 in. in diameter, is capable of making any shape of tablet and such things as moth balls. The "Aquapura" still, granulating mixers and wet granulating and shredding machines were included in the firm's exhibit.

Prominent among the exhibits of Howards and Sons, Ltd., Ilford, was their Standard ether. Calomel, bromides, iodides, corrosive sublimate, borax, mercurials, etc., were also shown.

Brown and Son, of Alembic Works, Wedmore Street, London, were showing and demonstrating their automatic still; this and a self-sealing steriliser and autoclave formed their main exhibits.

Jules Lang and Son, of Charlton Place, Islington, London, were showing all kinds of bottles for the chemical and perfumery trades, together with laboratory glassware and composition stoppers.

A high standard of printing was noticeable on the collapsible tubes of pure tin, tin coated, and lead, exhibited by the John Dale Manufacturing Co., of New Southgate, London. Their manufactures include collapsible tubes of all sizes, decorated or plain, perfume sprinklers, decorated and plain tin boxes for drugs, decorated and plain slip lid and lever lid canisters, and composition stoppers in all colours and designs.

Chemicals, soaps, and toilet preparations, etc., were shown by C. A. Stokes and Co., Ltd.; John Knight, Ltd.; T. S. Cleaver and Sons, Ltd.; T. F. Bristow and Co., Ltd.; United Laboratories and Chemical Co., Ltd.; John Bell and Croyden, Ltd.; The Scholl Manufacturing Co., Ltd.; Wright, Layman and Umney, Ltd.; Jeyes' Sanitary Compounds Co., Ltd.; J. M. Smith and Co.; Dubarry et Cie; P. H. Galloway, Ltd.; The Crookes Laboratories (British Colloids, Ltd.); The Erasmic Co., Ltd.; C. R. Harker, Stagg and Morgan, Ltd.; Price's Patent Candle Co., Ltd.; The Crown Perfumery Co., Ltd.; Menley and James, Ltd.; Oppenheimer, Son & Co., Ltd.; Fassett and Johnson, Ltd.; The Vinolia Co., Ltd.; John Bell, Hills and Lucas, Ltd.; The Charles H. Phillips Chemical Co.; Millton Manufacturing Co., Ltd.; H. and T. Kirby and Co., Ltd.; H. Bronnley and Co., Ltd.; Tokalon, Ltd.; D. and W. Gibbs, Ltd.; A. and F. Pears, Ltd.; and Lysol, Ltd.

"Sanitas" Company's Annual Meeting

Presiding at the annual meeting of the "Sanitas" Co., Ltd., held at the Abercorn Rooms, Liverpool Street, London, on Wednesday, the Chairman (Mr. C. T. Kingzett, F.I.C.), said that having regard to the depressed state of trade in the country, the great lack of export business, and, notwithstanding the necessity of further writing down the value of stocks in view of fallen prices, the company had done as well as could be expected in the year under review. The turnover had amounted to little short of the best years of the company's history, a state of things which reflected great credit upon the managing director, Mr. Norman F. Kingzett, and his staff, in very trying times. The profit on the year's trading sufficed to pay the full dividend of 9 per cent. on the preference shares of the company and 4½ per cent. on the ordinary shares. Their association with the great firm of Lever Brothers, Ltd., continued to be of the most satisfactory character, and the board looked forward with confidence to a continuous expansion of the company's business.

May Trade Returns

£130,000 Increase in Export of Chemicals

THE Board of Trade returns for May show a satisfactory expansion in home exports as compared with the corresponding month of last year. Imports and re-exports are also higher in value. Comparison of the two months is not altogether satisfactory in view of the coal strike which was in progress during the earlier period, but it is clear that when the fall of prices is also taken into account the recovery has been greater than is disclosed by the bare figures. During the past month imports were £8,753,000, and exports £2,537,000 above the April figures. On the other hand, re-exports were £234,000 less, and the adverse balance of trade, which in April stood at £15,953,000, rose last month to £21,569,122.

Imports of chemicals, drugs, dyes, and colours, at £869,163 were £74,242 less than in the preceding month. Exports under this heading, at £1,748,101 were £130,406 more than in April and £667,684 more than in May, 1921.

Imports of Chemicals

A comparison between quantities imported in May and April of this year respectively, shows considerable decreases under potassium compounds and calcium carbide, while imports of sodium nitrate have increased by 54,020 cwt. The remarkable increase in imports of cream of tartar (from 4 cwt. to 794 cwt.) referred to last month was continued during May, the quantity imported being 4,401 cwt. The detailed figures, in cwts., unless otherwise stated, are given below with the April figures in parentheses. INCREASES: Acetic acid (including acetic anhydride), 278 tons (270); tartaric acid (including tartrates not elsewhere specified), 2,936 (1,664); borax, 3,240 (2,505); crude glycerine, 6,472 (3,342); distilled glycerine, 662 (438); red lead and orange lead, 2,035 (1,301); sodium nitrate, 62,140 (8,120); sodium compounds other than nitrate, 14,664 (12,672); and cream of tartar, 4,401 (794). DECREASES: Bleaching materials, 967 (1,586); calcium carbide, 15,440 (29,554); potassium nitrate, 9,407 (18,367); potassium compounds other than nitrate, 268,213 (559,638); and zinc oxide, 358 tons (396).

Increased Exports of Sodium Sulphate

The features of the month's exports are sodium sulphate which shows an increase of 98,426 cwt., and tar oil, creosote, etc., which are 1,863,398 gallons more than in April. There are no really big decreases, glycerine and sulphate of ammonia being about the largest. The following figures show in detail the products, the May exports of which were larger (as to quantity) than in the preceding month; the April figures are given in parentheses, and the amounts are in cwts., unless otherwise stated:—Sulphuric acid, 1,193 (998); anthracene, 48 (nil); carbolic acid, 12,897 (12,409); naphtha, 8,652 gal. (7,276); naphthalene, 2,675 (1,713); tar oil, creosote, etc., 3,324,352 gal. (1,370,954); distilled glycerine, 1,631 (1,110); potassium chromate and bichromate, 2,197 (1,471); potassium nitrate, British prepared, 1,937 (1,653); sodium carbonate, including soda crystals, soda ash, and bicarbonate), 374,189 (340,516); caustic soda, 144,183 (133,210); sodium chromate and bichromate, 4,609 (2,925); sodium sulphate (including saltcake), 148,593 (50,167); sodium compounds not elsewhere specified, 59,976 (30,867); and zinc oxide, 273 tons (237).

The decreases, similarly compared, are: Tartaric acid (including tartrates not elsewhere specified), 244 (278); ammonia chloride (muriate), 475 tons (584); ammonium sulphate, 4,725 tons (8,951); bleaching powder, 15,639 (16,854); benzol and toluol, 6,787 gal. (13,316); coal tar products not elsewhere specified, 25,659 (30,447); copper sulphate, 6,571 tons (7,691); crude glycerine, 214 (1,029); and potassium compounds other than chromate, bichromate and nitrate, 2,488 (12,759).

Dyes and Dyestuffs

For the first time this year the returns disclose an import of coal tar intermediates amounting to 1 cwt. There were, again, no imports of synthetic indigo. Alizarine shows a very slight increase, and the figure for natural indigo is exactly doubled. Extracts for dyeing, with the exception of cutch, also show a considerable increase. The total quantity of finished coal tar dyestuffs imported during the month was 3,530 cwt., as against 357 in May, 1921, and 12,572 in May, 1920. The comparative figures for May and April this year are: Coal tar intermediates (including aniline oil and salt and phenyl glycine), 1 (nil); alizarine, 107 (105); finished coal tar dyestuffs other than alizarine and synthetic indigo, 3,422 (2,767); cutch, 2,716 (3,413); extracts for dyeing, all other sorts, 7,411 (3,849); natural indigo, 214 (107); and tanning extracts (solid and liquid), 63,461 (83,163).

Exports of dyes and dyestuffs were smaller as to quantity, although the value was considerably greater than in April. The total of 7,358 cwt. (as against 8,485 in April), made up of 3,229 cwt. of coal tar products and 4,129 cwt. of other sorts, was valued at £55,375, while the previous month's exports amounted in value to £32,117.

Imports of painters' colours and materials were smaller, particularly barytes, which was 10,000 cwt. less. Exports were nearly 5,000 cwt. in advance of the April shipments. The comparative figures are: IMPORTS: Ground barytes (including blanc fixe), 54,665 (64,575); white lead (basic carbonate), 13,112 (10,541); and painters' colours and materials, other sorts, 44,292 (45,711). EXPORTS: Ground barytes (including blanc fixe), 4,958 (4,065); white lead, 18,150 (11,773); paints and colours ground in oil or water, 19,086 (22,251); paints and enamels, prepared (including ready mixed), 17,938 (14,850); and painters' colours and materials, other sorts, 45,095 (47,417).

Scientific Instruments and Glassware

Scientific glassware (except tubing and rod) was imported to the value of £6,412 as against £6,181 in April, while 764 cwt. of glass tubing and rod, valued at £2,644 were imported, as compared with 177 cwt., of the value of £735, imported in the previous month. Exports of tubing and rod totalled 101 cwt., worth £929, against 77 cwt., of the value of £601, shipped in April. We imported 119,759 gross of glass bottles and jars, as against 119,137 gross, and exported 29,986 gross, as compared with 22,385 gross. Scientific instruments and appliances (except electrical) were imported to the value of £40,680, against £57,536, while the exports under this heading totalled £74,592, as against £75,934.

Coal exports were 960,652 tons more at 5,057,230 tons, and were worth £5,790,288 as compared with £4,650,455.

Proposed Advisory Science Committee

A NEW scheme for the development of British chemistry and science is being advanced by Sir William Pope, professor of chemistry at Cambridge University, who proposes the immediate establishment of an Advisory Science Committee to the Board of Trade.

"At present," said Sir William, discussing his proposals with a Press correspondent, "the direction of all matters of scientific importance to the nation seems to be in the hands of business men. Extravagance and muddling could be saved once and for all by the establishment of an advisory body of about twelve scientific and chemical experts, which would meet at stated intervals and give expert guidance to the Government in all matters concerning the nation's scientific welfare. As it would not be a part of the Government machine the cost of maintenance would be negligible, and the saving it could effect in national expenditure would be incalculable.

"Its immediate work might well lie in combating the efforts of German chemists to cripple our fine chemical industry by underselling, or in urging the Government to extend the cinchona plantations in India, so that, in the event of another war, we might not again be wholly dependent for quinine on the Dutch growers in Java or the German refiners. Or it might assist in organising cancer and consumption research. The scientific and technical talent of this country is at least as good as that of any other, but why have the fine chemical, the coal tar colour, and other allied industries been unsatisfactorily developed? The fault lies not with the chemists, but with either the business men or the Legislature, or both. France has a body similar to the one I suggest, and the German Government habitually consults its experts when engaged on scientific legislation."

British Dyestuffs Corporation

£1,443,000 Written Off Stock

NET losses amounting to £1,006,660 are reported by the British Dyestuffs Corporation, Ltd., for the year ended October 31 last. The report states that the sum of £467,106 has been allowed for depreciation and credit is taken for an estimated amount of £437,684 expected to be recoverable in respect of Excess Profits Duty. The sum of £1,443,344 is written off the values of stocks to reduce them to current market prices; £203,305 was brought forward, so that the debit balance to be carried forward is £803,366. No dividends are payable for the past year on any class of shares.

The report states that the very serious depression in trade referred to in the last report continued throughout the period under review; there was no increase in the consumption of dyestuffs by the consuming industries.

Stocks of dyestuffs imported freely into this country in the interval between the Sankey judgment and the passing into law of the Dyestuffs (Import Regulation) Act, the report continues, are being slowly dispersed, but they have seriously hampered the company's business. Shareholders will appreciate the effect on the company's trading of imports of foreign dyestuffs valued at over £7,000,000 during a period when consumption was less than one-third of the normal. The situation has been further complicated by the existence of very considerable stocks of dyestuffs brought into the country under the provisions of the Treaty of Versailles. These were factors of great magnitude entirely beyond the control of the board, which seriously affected the company's welfare.

Writing Down Stocks

The accounts not only reflect these unfavourable conditions but also the general fall in prices which has affected every important industry in this country. In addition to losses incurred through the sale of surplus raw materials below cost, a sum of over £1,440,000 was required to write down stocks on hand to present market values.

Shareholders, the report continues, will recollect that, encouraged by the sympathy of the Government and of users alike, and on the assumption that adequate protection would be afforded by Parliament, substantial obligations on capital account were incurred for extensions to the company's plants, and heavy commitments were entered into for supplies of raw materials. When trade began to decline the directors made every effort to curtail all further expenditure, and they are pleased to report that all commitments, both on capital and trading account, have been discharged at a small cost to the company. There are now no such liabilities other than those relating to current trade requirements. Every possible economy has been, and is being, effected in administration in order to bring the activities of the company within the limits required by existing conditions. These steps involved the closing down for the time being a large proportion of the plant, and satisfactory trading results cannot be expected until the colour-using trades have returned to more normal conditions, and the demand for the output of the company's factories has greatly increased.

Ample Financial Resources

The unprecedented circumstances of the last two years have it is stated, been a serious handicap to the progress of the undertaking. With a return to ordinary conditions of trade, the continued support of users, and the assistance derived from the Dyestuffs (Import Regulation) Act, the directors see no reason why the output from the factories should not ultimately compare favourably with that of any other country. It is satisfactory to be able to report that the conduct of the company's affairs during this critical period has left it with ample available financial resources, and with its undertaking and assets unencumbered. At the date of this report the company has in the bank and invested in easily realisable securities, a sum of over £1,250,000. The directors have continued to develop every phase of research. Improvement and standardisation of quality and reduction in costs have resulted from this expenditure, and new and important dyestuffs have been placed on the market. The scientific and technical research departments continue as hitherto under the supervision of Professor A. G. Green, F.R.S., and Mr. J. Baddiley, M.Sc.

Changes in Directorate

Sir Henry Birchenough resigned his position as chairman in August, 1921, and was succeeded by Sir William Alexander, who, in December, 1921, at the unanimous request of his colleagues, accepted the post of chairman and managing director. Mr. G. V. Clay, who after his election to the board last year was made responsible for the reorganisation of the works and technical staff and rendered great service to the company, recently resigned active control. Dr. J. C. Burnham, C.B.E., has been appointed general works manager. Dr. Burnham has had a long experience in the control of chemical and explosives works, and during the war occupied with distinction the responsible position of manager of H.M. factory at Gretna. In June, 1921, in consequence of the increased demands of his own business, Sir William Ackroyd, Bart., resigned his position as a director of the company. Dr. Herbert Levinstein resigned his seat on the board in May, 1922.

The annual meeting was to be held yesterday (Friday) at Milton Hall, 244, Deansgate, Manchester.

Suspension of Bankrupt's Discharge

THE affairs of David Victor Fairfax Erskine, lately of 21 Charterhouse Street, London, who had been interested in a secret process known as "Semely" for the preservation of leather and was adjudged a bankrupt in April, 1917, came before the London Bankruptcy Court on June 14, upon the hearing of his application for discharge. The Official Receiver reported that the debtor's estimate of £11,386 of his ranking liabilities was approximately correct. The estate had realised £113. In October, 1912, the debtor bought for £8,000 from Mr. Harold C. Joye, who afterwards became bankrupt, a one-half share in the "Semely" process. He paid £1,000 down and gave Mr. Joye a mortgage on an estate to secure the balance, but the mortgage was afterwards surrendered on the payment of a less sum provided by a relative who now held a mortgage on the estate. In October, 1912, the debtor and Mr. Joye entered into partnership with offices at 21, Charterhouse Street, E.C., and at or about the same time they bought the assets of a syndicate which had been manufacturing "Semely" for £3,500. In the following January they formed a syndicate styled Joye, Erskine and Co., Ltd., for the purpose of dealing with the process, and a company called the Semely Co., Ltd., was formed with a nominal capital of £82,000 to acquire the process, which was eventually sold for £31,000. On two statutory grounds, Mr. Registrar Hope imposed a suspension of the discharge for two years.

Affairs of the Keene Co.

MR. IRVING ALEXANDER KEENE (described in the receiving order as the Keene Co.), manufacturing chemist, 52, Gray's Inn Road, London, attended, before Mr. Registrar Francke, at the London Bankruptcy Court, on June 16, for his adjourned public examination on a statement of affairs showing liabilities £11,168, of which £10,818 were expected to rank, and estimated net assets £2,046 (see THE CHEMICAL AGE, Vol. VI., pp. 150, 460, 487, 597). The Official Receiver intimated that he had no further questions to put to the debtor. In reply to Mr. E. W. Hansell, who appeared on behalf of the trustee in bankruptcy, the debtor said that he remembered on January 27 last being questioned with reference to his American assets and business. The substance of his answers on that occasion was that there was nothing of importance in New York, because the business was being closed down. He denied the suggestion made by counsel that during the last few months he had been disposing or trying to dispose of his assets there. Nor was it true that he had written to people to that effect. He certainly had not instructed his solicitor to get rid of his assets in America. As the debtor's answers were not considered satisfactory, an application was made for an adjournment of the examination *sine die*. The Registrar remarked that the debtor had done everything he could to keep his assets from the trustee, and he should grant this application and adjourn the examination *sine die*.

Spoon-Fed Traders

By Sir Ernest J. P. Benn, Bart.

OUR business men are not rising to their opportunities. There never were so many opportunities in the world, and trade was never so slow, and so far as I am able to diagnose the position, I venture the opinion that this unfortunate situation arises from the habit of spoon-feeding into which trade and industry have sunk.

If anything is wrong, the only thing we seem capable of doing is to pass a resolution and send it to some Government Department; if, as of course happens, we get no satisfaction in that way, we then content ourselves with pious reflections upon the plight of the foreigner or the follies of somebody else, and we fold our hands, and wait for trade to revive. Could anything well be more futile?

As a nation of business men, we need to get back to Samuel Smiles; we want a good big dose of his old-fashioned self-help. If some of the great men whom Smiles catalogues for us could come back to life at this juncture and compare present conditions with those with which they had to struggle in their time, they would be amazed at the apathy, the indifference, the helplessness of the modern commercial mind. The working-man no longer thinks for himself, he does what his trade union leader tells him; he is relieved very largely of the responsibility of justifying his position. His master is following in the same foolish way, and placing too great a reliance upon the actions of others and far too little upon himself.

Politicians and Trade

Trade is what we make it, and will never be anything else. The conditions of which we complain are very largely the result of our own actions. Politicians and Government Departments can only deal with them after they have arisen, and even then, as a rule, they can do nothing but apply unnatural remedies, which in the end accentuate the disease.

It is not necessary to go back so far as dear old Samuel Smiles in order to illustrate these points. Smiles gives us some hundreds of cases showing the trials of genius, and how the blessings which we enjoy in the shape of material amenities are in almost every case the result of the indomitable will of some courageous individuals. We should not have had the loom or the steam engine if these inventors had waited for conditions to be favourable or even only mildly antagonistic, but there are many more modern instances, and it is not comforting to think that even in this year 1922 we are doing all we can to discourage invention and improvement.

Individual Effort

The closest study of the progress of mankind shows that every bit that we enjoy has been forced upon us by individual effort on the part of someone who was strong enough to believe that his salvation rested in his own hands, and that he had a duty to perform quite independent of anybody's opinion. Other people cannot arrange our fortune for us, nor can we arrange a fortune for other people. Our salvation is in every case in our own hands, and that salvation is spelt W O R K.

These truths are so evident to-day that it seems almost absurd to state them. We can see them demonstrated in individuals and in nations. In Russia we have one great and valuable illustration which ought to satisfy the world for all time of the futility of organisation, administration, and all those other fetishes which we call Bolshevism when we see them in the Russian form, but fail to describe properly when we are ourselves practising the same vices in our own arrangements at home.

In Germany we see the other side of the matter. The whole world is busy arranging affairs for Germany; every Government in Europe is telling Germany what it ought to do; supreme councils and world-wide conferences meet regularly in order to put Germany right. Germany the while goes on quietly working, and by that simple expedient will in course of time defeat the lot of us.

It is no good bothering what other people do or what other people think. From a business point of view, this attitude of mind is fatal. The business man who talks of trade as bad, who tries to find in the faults of others excuses for his own failings, who is waiting until others make trade good before he will himself become active is no business man at all; he ought straight away to join the most socialistic trade union he can find.

What is business? Surely it can be defined as supplying the needs of others. There never were so many needs, and, therefore, business ought to be good. It is not the duty of the business man to endeavour to alter conditions—that is the work of the politicians; the business man takes conditions as he finds them, makes a close study of them, makes quite sure that he thoroughly understands them, and then opens up an account based upon the knowledge he has acquired.

Anybody can sell goods when the buyer is in the centre of the market place with a bag full of money shouting at the top of his voice that he wants them. It does not take a business man to deal with a position like that.

We have become so thoroughly accustomed to a Ministry of Munitions which was prepared to give unlimited orders on a cost plus percentage basis that we have almost forgotten the nature of business. The worst of it is that we are so wealthy in this dear old England, thanks to the efforts of forefathers who invented trade and industry, that however foolishly we act we are not likely for some time to come to be reduced to the plight of less fortunate nations. But spoon-feeding out of capital, for that is what is still happening, cannot go on for ever; we must wake up and work, do real, effective work, and the work of the business man is to take risks, to adventure, to go out into markets that look unpromising, and transform their character, to find ways of overcoming difficulties, to rely upon himself and nobody else, and to give himself heart and soul to his calling.

"Times" Support for Sir W. Alexander

The Times, in its City News on the dyestuffs agitation, says:—"The City is not at all impressed with the circular issued by four shareholders in the British Dyestuffs Corporation criticising the management of the concern and asking for proxies, and we think shareholders would be wise to give Sir William Alexander their support at the annual meeting, which will take place on Friday. The circular is couched in very general terms, and it does not show that the signatories are well-informed as to the actual position of the company. For instance, it is well known amongst those acquainted with the business of the corporation that since the appointment of Sir William Alexander as chairman sweeping measures of reorganisation have been carried out. Stocks have been drastically written down; waste in various departments has been detected and stopped, overhead charges reduced very substantially, and the liquid position of the company greatly improved. The suggestion that Sir William Alexander, the present chairman, has no knowledge of the dye industry is misleading, because, although Sir William has not had an intimate experience of the manufacture of dyes, he has a very extensive knowledge of the manufacture of chemicals. That he possesses powers of organisation and business capacity is proved by the fact that at the end of a disastrous year the company has accumulated cash resources of £1,250,000."

The Prime Minister's Message

THE Prime Minister, who recently stated that the peoples of Europe, in "getting back to business," were "looking to England to give them the desired lead," has written congratulating Sir Ernest Benn on his controllership for Great Britain and the Dominions of the new non-political world newspaper *The European Commercial*. "I hope," says Mr. Lloyd George, "that *The European Commercial* will lead to a better understanding and co-operation between the business community and all the nations of Europe."

Chemical Conferences at Lyons

AT the meetings at Lyons, on June 27 to July 2, of the International Union of Pure and Applied Chemistry this country will be represented by Sir William Pope, Professor Lowry, Dr. Hewitt, Mr. Emile Mond, and Dr. Stephen Miall. A few delegates are expected from America, including Dr. Parsons, Mr. Washburn, Mr. Washington, and Colonel Barton.

Chemical Matters in Parliament

Norwegian Cement

Replying to Mr. James Wilson (House of Commons, June 14), Sir W. Mitchell-Thomson said he was not aware that the marketing company of the Associated Portland Cement Manufacturers were excluding from British markets cement produced in Norway under a threat to flood the Norwegian markets with British cement.

Packing of Drugs

Mr. Rhys J. Davies (House of Commons, June 15) asked the Home Secretary whether his attention had been drawn to the manner in which drugs and poisons were being packed by manufacturers, to the allegations that poisons were not properly described, and that insufficient time was allowed to the packers to do this important work properly; and whether he would cause inquiry to be made into the subject.

Mr. Shortt said he was informed by the Lord President of the Council, whose Department is responsible for the administration of the Poisons and Pharmacy Acts, that his Department had no knowledge of any allegations of the kind suggested. The Department had no power to intervene unless the provisions of the Acts or of the Regulations made under them were being infringed.

Duty on Gas Mantles

In answer to Mr. Kiley (House of Commons, June 15), Sir R. Horne said that in accordance with the award of the Referee a duty of 33⅓ per cent. was being levied on imported gas mantles in respect of the value of the mechanical aggregates of oxide of thorium and oxide of cerium and of nitrate of thorium, and nitrate of cerium, being ingredients of such mantles. It was not possible to give reliable figures of the duty so far collected as, pending authoritative determination of the value of these ingredients was being allowed if the importer so desired on deposit of a sum equivalent to the duty on a value of 25 per cent. of the value of the complete mantles.

Naphthalene Balls

Mr. Kiley (House of Commons, June 15) asked the Chancellor of the Exchequer why Hulse and Co., of Woodlesford, who imported certain naphthalene balls, were compelled to deposit an amount of 33⅓ per cent. on them, whilst the same substance in the nature of flakes was allowed in free, seeing that at Goole the substance, both in balls and flakes, was admitted free, and, in view of their inability to obtain the refund of the money deposited, could he take some prompt action to give them satisfaction; and would he issue instructions to his officials telling them clearly what articles were dutiable and what were not.

Sir R. Horne said the naphthalene balls and naphthalene flakes in question were submitted for expert examination, as the result of which the balls were found to be composed of naphthalene of dutiable quality, whereas the flakes were found not to be of that quality. In these circumstances, the duty could not be refunded.

Registration of Alkali Works

When Ways and Means were considered in Committee House of Commons, June 16) a motion was made and question proposed, "That in lieu of the stamp duties chargeable on certificates of registration of the works mentioned in Subsection (1) of Section nine of the Alkali, etc., Works Regulation Act, 1906, there shall be charged duties at rates which shall be fixed by the Treasury after consultation with the Minister of Health and the Secretary for Scotland, and which shall be such that the duties levied under the said Act shall not exceed the amount required to meet the costs incurred in respect of the remuneration (including superannuation allowances) and expenses of the inspectors, and otherwise in connexion with inspection under the said Act, and different rates of duty may be fixed as respects different classes of works."

The motion was opposed by Colonel P. Williams Sir F. Banbury and Major Morrison-Bell. On a division there voted for the motion, 97, and against, 42.

British Dyestuffs Corporation

Mr. Baldwin (House of Commons, June 19) informed Major Barnes that the British Dyestuffs Corporation was a large industrial company in which the Government have a subordinate interest. In his opinion, political investigations into he affairs of commercial companies did not make for commercial success. The conversations which had taken place between the Corporation and the German dyemakers had so far only been of a preliminary and non-committal character. Consequently, it had not been thought necessary to give any instructions to the Government directors of the British Dyestuffs Corporation, especially as they were fully acquainted with the general policy of the Government in respect to this particular industry.

Dye Industry Development

Major M. Wood (House of Commons, June 19) asked the President of the Board of Trade whether the Committee appointed by him under clause 2 (6) of the Dyestuffs (Import Regulation) Act, 1920, for the purpose of advising him with respect to the efficient and economical development of the dyemaking industry, had yet tendered to him any advice; if so, on what occasions the advice was given and what was its nature; and, if not, whether it was in consequence of the failure of the Committee to give such advice that the British Dyestuffs Corporation had sought the assistance and advice of the German dyemakers.

Mr. Baldwin said the Committee had made representations to him in respect of the supply of benzol for the dyemaking industry and the maintenance and development of research therein. But it had been chiefly engaged on important work in connexion with the co-ordination of manufacture, with a view to preventing unnecessary duplication of effort. The answer to the last part of the question was in the negative, though he did not accept Major Wood's statement as a correct description of the action of the British Dyestuffs Corporation.

Mr. Vernon Clay's Resignation

Replying to Lieut.-Commander Kenworthy (House of Commons, June 19), Mr. Baldwin said he understood that Mr. Vernon Clay had resigned from one post held by him in the British Dyestuffs Corporation, but he was not aware of his second resignation. He believed that the board of directors, as at present constituted, was making the most strenuous endeavours to establish the dye industry in this country, and he believed that in time they would be successful.

Negotiations with the I.G.

Answering Mr. Hogge and Major M. Wood (House of Commons, June 19), Mr. Baldwin said he did not think it advisable at the present time to make a statement on the object of the negotiations between the Dyestuffs Corporation and the I.G. He always approved of negotiations, but whether he approved of the result or not was another matter.

Safeguarding Act Orders

Mr. Baldwin informed Major Barnes (House of Commons, June 19) that synthetic camphor, citric acid, cream of tartar, R. lactose, santonine, and tartaric acid have been removed by direction of the Referee from the lists issued by the Board of Trade under Section 1 (5) of the Safeguarding of Industries Act. A small number of other items had been deleted, and in certain other cases the standard of the dutiable grade had been raised, in accord with what the Board understood to be the general views of the Referee. In respect of certain of the deletions the action of the Board had been challenged by persons interested. No order had yet been made under Part II. of the Act.

Anti-Dumping Policy

Replying to Mr. Asquith, Sir Donald Maclean, and Mr. Hogge (House of Commons, June 19), Mr. Chamberlain said it was the intention of the Government to lay before the House at a very early date for approval, in accordance with the provisions of Section 2 (4) of the Safeguarding of Industries Act, an Order under Part II. of the Act in respect of certain classes of goods as to which Committees had reported that the conditions laid down in the Act were fulfilled. He thought an opportunity for discussion would be found within a month. The Order would cover all cases in which the Committee had reported in favour of the Act being applied.

Key Industries List

Answering questions by Mr. T. Thomson and Mr. Kiley (House of Commons, June 19), Mr. Baldwin said he was not aware that several thousands of articles on which duties were levied were not in the lists issued by the Board of Trade under the Safeguarding of Industries Act.

From Week to Week

The address of THE KIESELGUHR AND INFUSORIAL EARTH Co. is now 7, Victoria Street, London.

Mr. H. E. BUCKLEY has been appointed Assistant Lecturer in Crystallography at Manchester University.

The premises of KINKEAD AND Co., manufacturing chemists, Hamilton Place, Belfast, were gutted by a fire which broke out on June 14.

The Council of King's College, London, have appointed PROFESSOR J. F. THORPE, F.R.S., to membership of the Corporation of King's College.

THE RUBBER CHEMICAL Co., LTD., announce their removal to more commodious premises at 17, Mincing Lane, London. The new telephone number is Minories 1977.

On June 27 the INTERNATIONAL RUBBER GROWERS' ASSOCIATION will meet at the Hague to establish the attitude of the Association with regard to the proposed restriction of production.

It is announced that the Department of Scientific and Industrial Research has undertaken the cost of the ISSUE AND DISTRIBUTION of the first number of the *Journal of Scientific Instruments*.

The annual autumn meeting of the INSTITUTE OF METALS will be held in Swansea on September 20, 21 and 22. Particulars are obtainable from Mr. G. Shaw Scott, 36, Victoria Street, London.

It is announced that financial help from various sources has now made it possible to proceed with a further instalment of the scheme providing for CONSIDERABLE EXTENSIONS at the science schools, Harrow.

Applications are invited for a junior LECTURESHIP IN CHEMISTRY in the University of Edinburgh. Special qualifications in physical chemistry are desirable, and applications should be addressed to the Secretary, University of Edinburgh.

In a letter to the Press, PROFESSOR J. B. COHEN, of Leeds University, gives an account of the delays he has experienced in obtaining imported research chemicals from the Customs authorities. He advocates the suspension of the duty on research chemicals.

A joint meeting of the Chemical Engineering Group and the Chemical Industry Club will be held on June 28 at 8.15 p.m. to meet DR. R. F. RUTTAN, the retiring President of the Society of Chemical Industry. Dr. Ruttan will address the meeting on "The Training of the Chemical Engineer."

Mr. J. KNOX, of Lever Brothers, Ltd., was elected a member of the executive committee at the annual conference in Glasgow, on June 16, of the Association for Education in Industry and Commerce. Mr. COOK, also of Lever Brothers, spoke on the question of education for foremanship.

Operations have been proceeding for several months at Dalroy, within a short distance of Culloden Moor Station, on the Highland Railway, with the object of ascertaining the extent of a MANGANESE DEPOSIT for possible commercial development. The depth of the shaft is upwards of 40 ft.

The Executive Committee of the Imperial Commercial Association have passed a resolution expressing the opinion that it is a matter of extreme urgency that the Government should at once set up a commission to inquire into the ADMINISTRATION AND WORKING of the Safeguarding of Industries Act.

At a meeting of the board of directors of Lever Brothers, Ltd., held at Port Sunlight on Tuesday, MR. JOHN CHESHIRE, who, since 1919, has been deputy director, and for many years general advertising manager, was appointed a managing director of the company. Mr. Cheshire is a well-known figure in the advertising world.

The works of SHAW and Co., Ltd., soap and candle manufacturers, Mountpottinger Road, Belfast, were destroyed by fire on June 16. With the exception of the glycerine house the premises were entirely gutted. It appears that the night watchman was held up by armed men, who sprinkled the works with petrol and fired it at several points.

The Secretary for Mines announces that in connexion with the FORTHCOMING RETIREMENT of Mr. J. Dyer Lewis, H.M. Divisional Inspector of Mines in charge of the South Wales Division, he has promoted Mr. J. M. Carey, at present serving as a Senior Inspector in that division, to be Divisional Inspector in place of Mr. Dyer Lewis; and Colonel J. A. S. Ritson to be a Senior Inspector of Mines in place of Mr. J. M. Carey.

It is reported that a plan for the development of the United States Government's NITRATE AND POWER PROJECTS at Muscle Shoals, Alabama, has been prepared. One of the amendments to the Ford proposals would compel the purchaser or lessee to manufacture fertilisers and sell them to the public throughout the period of the contract. The minimum annual production is expected to be 40,000 tons of ammonium nitrate.

After addressing a public meeting of the National Union of Scientific Workers at University College, Gower Street, London, on June 15, MR. T. W. SANDERSON, headmaster of Oundle, collapsed and died almost immediately from heart failure. Earlier in the day Mr. Sanderson had visited the Rothamsted Experimental Station at Harpenden, in the agricultural experimental work of which he had collaborated at his school.

ALLEN LIVERSIDGE, LTD., have prepared a cinematograph film demonstrating the application of dissolved acetylene in metallurgical operations. The ultra-rapid camera was employed in the preparation of the film, which reveals an intensely interesting picture of the action of molten metal under the blow-pipe. In addition to presenting a representative study of the industrial applications of dissolved acetylene, the firm also depicts the process of the actual manufacture of the gas.

LIONEL ROBINSON AND CO. (partners: Lionel Robinson and W. E. Warrilow), 3, Staple Inn, London, have been appointed selling agents for the Moler Fireproof Brick and Partition Co., Ltd., for the handling of their Moler refractory material which they are putting on the market for electric cookers, fires, grills, hotplates, etc., under the trade name of "Radmolite." The company also handles "Moler" in porous and granular form for the thermal insulation of electric ovens, furnaces, etc.

According to reports from Paris, it is understood in American circles there that the AMERICAN SHARE OF DYES, which are delivered by Germany under the reparations agreement, is likely to be automatically stopped after June 30, if plans now under consideration by the Reparations Commission are carried out. A statement made by Mr. Herman A. Metz, who is now in Berlin, shows that America still needs German dyes if the full demands of the United States industries are to be met. America, it is stated, is not manufacturing at home more than 70 per cent. of her requirements.

THE NATIONAL UNION OF MANUFACTURERS has called a conference of manufacturers to be held in the Central Hall, Westminster, on Wednesday, June 28. The president of the Union, Mr. George Terrell, M.P., will preside, and the Duke of Northumberland, Mr. F. Dudley Docker, and others will speak. Among the resolutions to be submitted are those dealing with the speeding up of the procedure under Part II. of the Safeguarding of Industries Act, the prompt imposition of a duty in accordance with the findings of the Committees, and the enactment of an amending Merchandise Marks Act.

The newly-founded "Metallografiska" Institute, of Stockholm, has been presented by SIR ROBERT HADFIELD with an annual sum of £150 for two years for a scholarship to be held at the Institute, preferably by an Englishman. Sir Robert Hadfield intends this gift as an "expression of the debt of gratitude which the world owes to Swedish science," and he points out that Swedish chemists can claim the honour, not only of having first discovered and separated many of the elements that have become of importance in the manufacture of modern alloy steels, but also of having made a number of fundamental advances in practical metallurgy.

The twelfth ordinary meeting of the ROYAL SOCIETY OF EDINBURGH was held last week, when Professor F. O. Bower, who presided, presented the Keith and Neill Prizes. Dr. A. P. Laurie submitted a communication on "Chemical Combination and Sir Alfred Ewing's Magnetic Atom." He pointed out that the recent paper by Sir Alfred Ewing on "Hysteresis of Iron" had profound significance for the chemist, as he had shown that it was possible to devise an atom of fixed and rotating magnets free from polarity, and that on the approach of another atom the rotating unit could be moving into an unstable position and then fall into a new stable position with evolution of heat.

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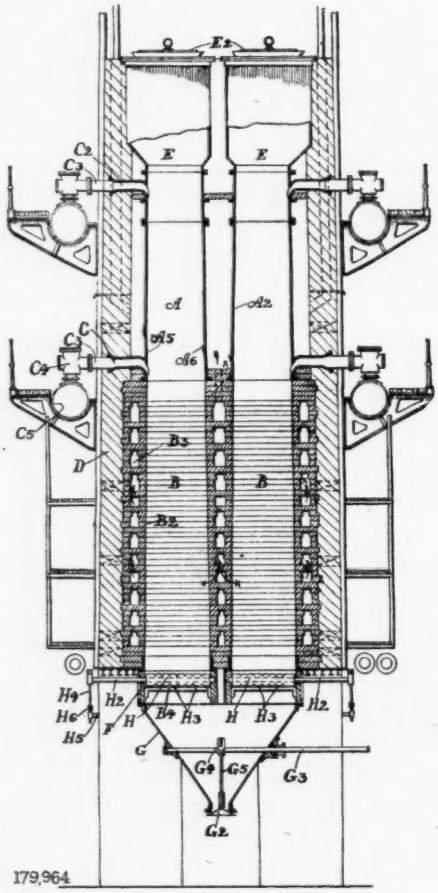
179,964. RETORTS FOR THE DISTILLATION OF OIL-BEARING SHALES OR OTHER LIKE MATERIALS. J. S. Black, La Chateau, Setchey, King's Lynn, Norfolk. Application date, July 29, 1921.

The retorts are mounted in pairs A, A^2, placed back to back, and a group of two such pairs is enclosed in brickwork. The



179,964

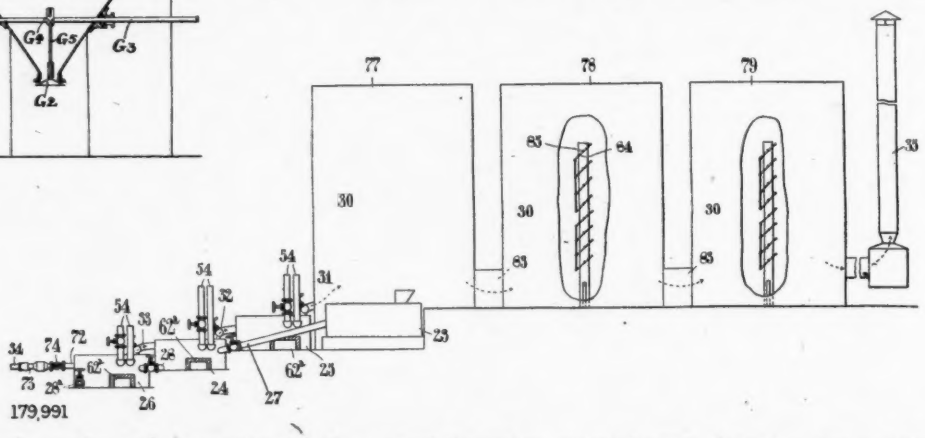
retorts are of flat rectangular section and are constructed of firebrick B^2, which contains heating flues B^3 arranged so as to lead the heating gases in a tortuous path around the retorts. The upper ends of the retorts are constructed of iron, and are provided with discharge conduits C, C^2 at different levels, which are connected by stop valves C^4 to the discharge mains C^5. The supply hoppers E are of sufficient size to contain about 18 hours consumption of shale. The four retorts of a group are connected at their lower ends to a common inverted conical chamber G, having a discharge door G^2 for the residue, operated by a rod G^3. A device for breaking up and facilitating the discharge of the spent shale and clinker consists of a member H oscillating about a horizontal shaft H^2 within the retort and carrying serrated fins H^3 above and below the axis. The angular movement of the device H is varied by operating it through an adjustable connecting rod H^4. The weight of the material in the retort is taken by a platform B^4, which is arranged at a sufficient distance from the member H to provide a passage for the disintegrated material.

179,982. SODIUM FERROCYANIDE, MANUFACTURE OF. F. F. Delaroziere, 22, Avenue Jean Jaurès, Gentilly (Seine), France. Application date, January 17, 1921.

In the usual process for producing sodium ferrocyanide by double decomposition of calcium ferrocyanide and sodium carbonate, the calcium carbonate produced is very fine and difficult to filter, and considerable washing is necessary to free it from ferrocyanide. In the present process, the sodium carbonate is replaced by sodium sulphate, and the resulting calcium sulphate precipitate is readily filtered *in vacuo* or centrifugally. The sodium ferrocyanide obtained by this reaction is neutral or slightly acid, and is liable to be turned blue on contact with iron vessels. To avoid this, the reaction is effected by using about 10 per cent. less sodium sulphate than that theoretically necessary, so that the sodium ferrocyanide contains calcium ferrocyanide. The filtrate is then treated with a slight excess of sodium carbonate which decomposes the calcium ferrocyanide and renders the solution slightly alkaline so that it does not attack an iron vessel. The amount of calcium carbonate precipitated is only about one-tenth of that in the older process and is readily filtered. The hot aqueous solution of sodium ferrocyanide is then treated with solid sodium chloride, and the ferrocyanide is precipitated from the sodium chloride solution, in which it is less soluble than in water. Instead of pure sodium sulphate, salt cake which contains sodium chloride may be used.

179,991. PURIFICATION OF NAPHTHALENE AND OTHER VOLATILE SOLID ORGANIC BODIES. C. E. Andrews, C. Conover, K. B. John, and C. E. Ruth, 810, House Building, Pittsburgh, Pa., U.S.A. Application date, January 19, 1921.

The crude material is melted, and the lighter part separated and subjected to the action of an inert gas while heated to a vaporising temperature. The vapour is then fractionally condensed. The crude naphthalene is charged into a melter



179,991

23, and the molten material passes through a pipe 27 into a vaporiser 24 where it is subjected to the action of a caustic alkali. The liquid residue passes through a pipe 28 into another vaporiser 26 which is at a higher temperature. Air is supplied through the pipe 34 to the vaporiser 26 and carries the vapour through the vaporiser 24 to the vaporiser 25 which is at a lower temperature. Some vapour is condensed, and the remainder passes to a condenser 30, where naphthalene is condensed. The condenser consists of a series of chambers 77, 78, 79 connected by passages 83. The chambers 78, 79 contain pivoted baffle plates 84, so that they may be closed to any desired extent from outside the chambers. The melter 23 consists of a metal casing having a heating coil through

which hot oil is circulated. The vaporisers 24, 25, 26 are of similar construction, and each contains a heating coil in the bottom, through which hot oil is circulated. The cover is removable and supports depending baffles, which are alternately in contact with the cover and spaced from it, so as to circulate the material upward and then downward over the heating coil. The vaporiser 26 contains in addition another pipe coil having a series of outlet nozzles through which air or other gaseous fluid is delivered. The varying temperatures in the vaporisers cause a partial condensation and re-evaporation of some of the vapour and the vapour is washed by passing through the liquid. The phenols, cresols, &c., react with the caustic soda, and non-volatile compounds are formed.

180,016. Formaldehyde or its Polymers, Process for the Preparation of—from Mixtures of Carbon Monoxide and Hydrogen. E. I. Lush, 4, Milner Street, London, S.W.3. Application date, February 12, 1921.

A mixture of carbon monoxide and hydrogen, which may be obtained by purifying water gas, is passed over a catalyst such as nickel and/or copper and a hydrated metal oxide such as alumina. The catalyst is used in granular form, and the gas is forced through it at a pressure of 10 atmospheres and an initial temperature of 300°–400° C. The final temperature must not be below 160°–180° C. The activity of the hydrated metal oxide may be restored by blowing steam through it or by mixing steam with the gas. In the latter case, a higher temperature is necessary. The catalyst may consist of nickel 4 parts, copper 1 part, and alumina 5 parts. The residual gas contains a large proportion of methane and hydrogen, and is of use as an illuminating gas. A large yield of formaldehyde, and liquid and solid condensation products is obtained. By varying the temperature, rate of flow of gas, and composition of the catalyst, the formaldehyde may be obtained polymerised.

180,021. Oxidised Ores, Treatment of. W. G. Perkins, 62, London Wall, London, E.C.2. Application dates, February 14 and February 21, 1921.

The process is applicable to ores containing silicates, carbonates, sulphates, oxides, etc., for separating the values from the gangue. The ore is heated with sulphur or sulphur and iron in an atmosphere which is not oxidising, so that a magnetic compound is obtained. If the ore contains no iron or other magnetic substance, iron pyrites may be used as the sulphur-bearing substance. The ore is finally subjected to magnetic separation. The process is particularly suitable for treating copper carbonate ores, in which case the dry crushed ore is heated to 400°–600° C., with pyrites, in a non-oxidising atmosphere. The copper, sulphur and iron product recovered by magnetic separation is particularly suitable for smelting into copper by the usual methods. As preliminary steps, the ore may be heated in a reducing atmosphere, and may be subjected to froth flotation to obtain a more concentrated copper product for conversion into a magnetic compound. If steam is employed, as the non-oxidising atmosphere, sulphur dioxide and sulphuretted hydrogen are produced and react outside the furnace to yield sulphur. Hydrogen, producer gas or a hydrocarbon, may also be used. The process may be carried out in a multiple hearth furnace, so that the reduction of the oxidised copper is effected in the upper hearths, and the heating with pyrites is effected in the lower hearths. The process is also applicable to oxidised nickel and lead ores.

180,023.—Drying Solid Substances, Apparatus for. N. S. Kilner, Hepworth Chambers, Leeds. Application date, February 14, 1921.

The material is fed by a horizontal conveyor into a hopper having a vertical shaft carrying radial arms which assist the downward passage of the material on to a horizontal rotating plate having radial ribs. The material is directed outwards by these ribs and falls on to the uppermost of a superposed series of radial shelves. Radial arms carried by a central shaft move over the shelves and direct the material through the gaps between the shelves, on to the series next below, and so on. Each radial shelf has its rear edge directed downwards at an angle of about 45° so as to direct the hot drying gases at an angle of about 45° upwards through the falling streams of material.

180,024. Purifying Gases, Process for. J. Y. Johnson, London. From Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany. Application date, February 14, 1921.

It is found that carbon oxysulphide, which is usually difficult to remove from gases, is readily absorbed by passing the gas over active charcoal which has an alkaline reaction. Active wood charcoal, or charcoal deposited on fireproof carriers may be used, and is rendered alkaline by means of ammonia or the ammonium salt of a weak acid. The carbon oxysulphide absorbed must be oxidised by means of oxygen added to the gases, in order to maintain the activity of the charcoal. The process is particularly suitable for purifying gases which are intended for the synthesis of ammonia from small quantities of carbon oxysulphide, such as 0·001 gram per cubic metre.

180,027. Fertilisers containing Phosphoric Acid and Potash, Process for the Production of. T. Haege, Via Ostiense III, Rome. Application date, February 15, 1921.

A mixture of natural phosphate 10 parts, leucite, phonolite, potash felspar or other alkali silicate 8 parts, and limestone or marl 4 parts, is crushed, and then fused with coke in a blast furnace. The furnace is water-cooled near the melting zone, and the air blast is preheated by the waste gases and enriched with oxygen. It is found that the column of material in the furnace acts as a filter and a chemical binder for the volatilised phosphoric acid and potash, provided that the column is not less than two metres in height. The molten material is tapped off and disintegrated by means of high-pressure steam and/or air, and/or water, and the gases are then filtered. The disintegration of the material in this manner decomposes any calcium sulphide present, which would otherwise be an injurious constituent of the fertiliser. The waste gases from the furnace are passed through dust-collecting chambers, and the dust containing phosphorus and potash is added to the fertiliser.

180,081. Distilling and Gasifying Peat and Like Substances. A. A. F. M. Seigle, 3bis, Rue Clément Marot, Paris. Application date, February 24, 1921.

Peat or lignite is ground to a pulp and 100 parts are mixed with 225 parts of powdered limestone, 44 parts of powdered clay and silica or silicates, 28 parts of powdered quicklime, and 3 parts of granulated calcium chloride. This mixture is relatively dry and is moulded into blocks which are allowed to harden, and are subjected to the action of saturated steam under pressure of 6 kilos per sq. cm. in a digester, whereby hydrosilicates are formed. The blocks are then heated very slowly to 550°–580° C. for 15–20 hours either in a horizontal gas retort, a vertical retort, or a retort of the type used for producing metallurgical coke. This is followed by a calcination at a temperature of 1,100°–1,200° C., which yields hydraulic lime, or 1,500° C., which yields cement. The combustion gases may be used for a preliminary distillation of another charge. During the low temperature distillation, ammonia, acetic acid, methyl alcohol and coal tars are obtained, while during the high temperature distillation gas is obtained.

180,089. Composite Titanic Oxide Products, Manufacture of. B. E. D. Kilburn, London. From the Titanium Pigment Co., Inc., 94, Fulton Street, New York. Application date, February 28, 1921.

The product is a composite pigment of titanic oxide and barium sulphate, which is of increased covering power owing to the manner in which the barium sulphate is prepared. A 20 per cent. solution of barium sulphide and a 25 per cent. solution of sodium sulphate are mixed together at 95° C., when barium sulphate is precipitated in a very finely divided or dispersed condition, which is physically different from the more compact crystalline form. The barium sulphate is mixed with a solution of titanic sulphate, which is heated to 103°–105° C. to precipitate a basic sulphate on the particles of barium sulphate. The mixture is filtered and the product calcined at 900° C., when titanic oxide is produced and the barium sulphate is converted into the crystalline form which is very intimately permeated with the titanic oxide. The product has a high covering power, and requires only 70–75 per cent. of the usual quantity of linseed oil when ground in oil.

NOTE.—Abstracts of the following specifications which are now accepted appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention :—159,164 (Condensite Co. of America), relating to phenol-aldehyde condensation products, see Vol. IV., p. 541 ; 160,455 (Rheinisch-Nassauische Bergwerks- and Hutten-Akt.-Ges. and A. Spieker), relating to extracting zinc from lead slags, retort residues, poor ores, etc., see Vol. IV., p. 593 ; 160,750 (C. A. Stevens), relating to reducing ores, see Vol. IV., p. 626 ; 160,765 (Soc. Chimique des Usines due Rhône, anciennement Gilliard, P. Monnet, et Cartier), relating to aromatic aldehydes and derivatives, see Vol. IV. p. 626 ; 170,840 (Norsk Hydro-Elektrisk Kvaelstofaktieselskab), relating to concentrated nitric acid, see Vol. V., p. 802.

International Specifications not yet Accepted

178,443. ELECTRIC FURNACES. A. H. Pehrson, 14B, Ostermalmsgatan, Stockholm. International Convention date, April 12, 1921.

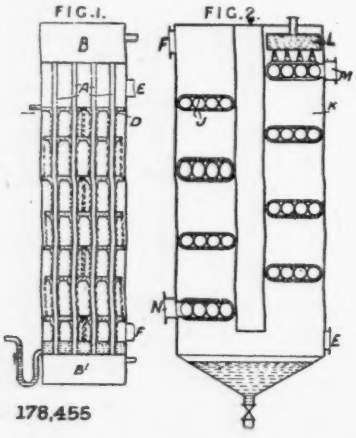
In an electric furnace suitable for the production of iron, the ore is fed into a horizontal preheating chamber through which pass the gases from the electric furnace, together with an air blast and additional fuel if required. The ore then passes into an adjacent co-axial chamber, where preliminary reduction takes place by means of the carbon monoxide formed in the main furnace. The ore then passes into the furnace, which is in the form of a drum with electrodes projecting inwards from opposite ends and arranged in a circle around the axis. Carbon is introduced directly into the furnace, and the system is mounted so as to rotate or oscillate. In another furnace adapted for the production of zinc, the zinc ore and carbon are fed into the preheating chamber which is non-rotary, and the mixture then passes into the extended neck of the electric furnace, which forms a preliminary reduction chamber. The mixture then passes to the main furnace, from which the zinc distils to a condenser on the opposite side, while the carbon monoxide passes to the preheating chamber. When sulphurous zinc ores are used a furnace similar to that employed for iron is used.

178,454. ELECTRIC FURNACES. A. Helfenstein, 50, Bastiengasse, Vienna. International Convention date, April 12, 1921.

An electric furnace suitable for the production of calcium carbide and iron, or zinc and phosphorus, is provided with central vertical electrodes, and with inclined charging conduits at each side so that the charge forms a trough along the furnace. In a modification, two sets of inclined electrodes are arranged immediately below the inclined charging conduits.

178,455. COOLING GASES. L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés. G. Claude, 48, Rue St. Lazare, Paris. International Convention date, April 15, 1921.

The apparatus is more particularly for cooling compressed air which is to be liquefied. The gas to be cooled passes from



the chamber B1 to the chamber B through pipes A which are cooled by liquid which trickles over them from plates D. The liquid is cooled by evaporation into the air which is continuously circulated through the apparatus from E to F. In a modification, the tubes through which the gas flows are arranged in horizontal coils and are covered by absorbent material J, which is kept wet by liquid from a tank L. The air which is circulated through the casing from E to F to cool the water by evaporation is the dry air resulting from the liquefaction process.

LATEST NOTIFICATIONS.

181,309. Process and apparatus for removing gases from liquids. Soc. Anon. Union Thermique. June 8, 1921.
181,365. Process for treating substances liable to oxidation by the action of air. Moureu, C., and Dufraisse, C. June 8, 1921.
181,375. Process of producing anhydrous magnesium chloride. Aktieselskabet Norske Saltverker. June 13, 1921.
181,385. Process of making anhydrous metallic chlorides. Jacobson, B. H. June 10, 1921.
181,388. Process for the production of basic magnesium carbonate. Chemische Fabrik Griesheim-Elektron. June 11, 1921.
181,391. Dyeing of alkyl celluloses. Lilienfeld, L. June 13. 1921.
181,392, 181,393, and 181,395. Manufacture of cellulose derivatives. Lilienfeld, L. June 13, 1921.
181,326. Process for the manufacture of hydrogen, carbonic oxide, or mixtures of these gases. Norsk Hydro-Elektrisk Kvaelstofaktieselskab. June 7, 1921.

Specifications Accepted, with Date of Application

159,823. Pure retort carbon, Manufacture of. I. Szarvasy. January 29, 1918.
160,172. Bicarbonate of soda and ammonium chloride, Processes for the production of. L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés, G. Claude. March 17, 1920.
160,466. Carrying out of catalytic processes involving gaseous or vaporous carbon compounds. Chemical Fuel Co. of America. March 18, 1920.
162,657. Plastic material from casein, Manufacture of. E. Krause and H. Blucher. May 3, 1920.
164,357. Synthetic camphor, Manufacture of. L. Darrasse, E. Darrasse, and L. Dupont. June 9, 1920.
170,601. Precipitating dust from gases by electricity, Apparatus for. Siemens Schuckertwerke Ges. October 22, 1920.
170,848. Electric furnaces. Norske Aktieselskab for Elektrokemisk Industri-Hypotekbank. November 1, 1920.
180,719. Cracking hydrocarbons, Process and apparatus for. C. S. Davis. January 26, 1921.
180,734. Grids for gas purifiers, scrubbers and the like. H. S. Sadler. February 23, 1921.
180,837. Magnesite, Method of treating. R. D. Pike. April 6, 1921.
180,890. Pulverisers and crushing mills. F. G. Brettell (*Soc. Anon. les Ateliers Réunis*). May 25, 1921.
180,963. Distilling, concentrating or drying apparatus. T. Rigby. December 24, 1920.
180,968. Preparatory treatment of ores or metallurgical products. O. Y. Imray. (*Jackson & Co.*) April 27, 1921.

Applications for Patents

Baumgartner, E. Manufacture of chromate of soda. 16,651. June 15.
Chemische Fabrik Griesheim-Elektron. Process for production of basic magnesium carbonate. 16271. June 12. (Switzerland, June 11, 1921.)
Erikson, O. Soda recovery process in sulphate paper-pulp manufacture. 16687. June 16.
Higginbotham, J. Production of hydrocarbons. 16364. June 13.
Howards and Sons, Ltd., and Blagden, J. W. Manufacture of thymol. 16632. June 15.
Hurter, A. Method of manufacture of alumina from sulphate of aluminium. 16640. June 15.
Jacobson, B. H. Process of making anhydrous metallic chlorides. 16197. June 12. (United States, June 10, 1921.)
Jones, T. R. Process for manufacture of a zinc-oxide substance. 16,528. June 14.
Levey, A. E. Process for continuous deodorisation of edible oils and fats. 16213. June 12,
Lilienfeld, L. Dyeing alkyl celluloses. 16306. June 12. (Austria, June 13, 1921.)
—— Manufacture of cellulose derivatives. 16307. 16308. 16310. June 12. (Austria, June 13, 1921.)
Morison, D. B. Deaerating or degasifying liquids. 16479. June 14.
Robinson, C. S. Purification or refining of sulphur. 16289. June 12.
Techno-Chemical Laboratories, Ltd. Drying moist materials. 16818. June 17.
Trevor, S. R., and Moosman, J. E. Manufacture of paints. 16270. June 12.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.*

LONDON, JUNE 22, 1922.

THE demand for chemical products has been moderately active this week, especially for heavy products.

Values on the whole are very firm, and price advances are recorded on several articles.

Export trade has not been quite so active, although there is a fair volume of inquiry.

General Chemicals

ACETONE is very scarce, and the price is firm.

ACID ACETIC has been quite active, and the price is without change.

ACID CITRIC maintains its last advance and is practically unobtainable on the spot.

ACID FORMIC remains in poor demand.

ACID LACTIC is without change.

ACID OXALIC continues in small request, without change in value.

ACID TARTARIC is becoming very scarce for near delivery, and the price is higher.

BARIUM CHLORIDE continues practically unobtainable, and the price shows no signs of weakening.

CREAM OF TARTAR has further advanced and is now comparatively scarce for spot.

IRON SULPHATE has been in better demand, and there is some export inquiry.

LEAD ACETATE is very firm, and the price is without change.

LEAD NITRATE has been still more active.

LITHOPONE is scarce and firm.

POTASSIUM CARBONATE is without change.

POTASSIUM CAUSTIC has been slightly more active, but is still in buyers' favour.

POTASSIUM PRUSSIATE has further advanced and is now practically unobtainable on the spot.

SODIUM ACETATE is quite active, and the price is well maintained.

SODIUM BICHROMATE.—The improvement in demand is continued, and sales are readily made at makers' prices.

SODIUM NITRITE has been very active.

SODIUM PHOSPHATE is without change in value.

SODIUM PRUSSIATE continues firm and scarce.

WHITE LEAD is without change.

ZINC OXIDE is very firm, and only limited supplies are available.

Coal Tar Intermediates

Business has been rather quieter during the past week, with less inquiry on home account. Foreign buyers, however appear to continue interested, and a certain business has been done for export.

ALPHA NAPHTHOL is quiet in this country, but one or two orders are about for export.

ALPHA NAPHTHYLAMINE is without special feature.

ANILINE OIL continues to pass regularly into consumption on home account, and fair orders have been booked.

ANILINE SALT is unchanged.

BENZIDINE BASE.—Some fair inquiries have been received.

BETA NAPHTHOL is without special change.

BETA NAPHTHYLAMINE is steady, and some fair orders have been booked.

DIMETHYLANILINE has been inquired for.

DINITROBENZENE.—Export buyers are interested.

DINITROCHLORBENZOL.—The price is rather firmer, but demand is somewhat irregular.

DINITROPHENOL.—Foreign orders are in the market.

DIPHENYLAMINE is very firm, with small stocks available.

"G" SALT.—A small home business is passing.

"H" ACID.—The price is firm, and only small quantities are available.

NAPHTHIONIC ACID is steady, with good business passing on home account.

NITROBENZOL.—There is nothing to special report.

PARANITRANILINE.—Some small home inquiry and slight export interest.

"R" SALT is unchanged.

Coal Tar Products

There is a fair amount of activity in some articles, while others are neglected.

90's BENZOL is still slow of sale, without change in value.

PURE BENZOL is quietly steady at 2s. 4d. per gallon.

CREOSOTE remains firm, with business at 4⅜d. to 4½d. per gallon in the Midlands, and 5¼d. to 5½d. per gallon in London.

CRESYLIC ACID.—The demand is fairly good, and some transactions have taken place at the prices quoted last week, namely, 2s. 3d. to 2s. 4d. per gallon for Pale 97/99% and 1s. 10½d. to 2s. per gallon for Dark 95/97%.

SOLVENT NAPHTHA remains very dull, with occasional business at 1s. 8d. to 1s. 9d. per gallon.

HEAVY NAPHTHA is quiet, and without change in value.

NAPHTHALENE is still in poor demand.

PITCH.—Further transactions have taken place during the week at the parity of 70s. f.o.b. East Coast and London, and 65s. to 67s. 6d. f.o.b. West Coast.

Sulphate of Ammonia

The home trade remains very dull, but there is rather more inquiry for export.

Current Prices

Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	8	to	0	1	10
Acetone oil	ton	77	10	0	to	80	0	0
Acetone, pure	ton	73	0	0	to	74	0	0
Acid, Acetic, glacial, 99–100%	ton	67	0	0	to	68	0	0
Acetic, 80% pure	ton	42	0	0	to	43	0	0
Arsenic, liquid, 2000 s.g.	ton	67	0	0	to	70	0	0
Boric, cryst.	ton	60	0	0	to	65	0	0
Carbolic, cryst. 39–40%	lb.	0	0	6	to	0	0	6¼
Citric	lb.	0	2	6	to	0	2	7
Formic, 80%	ton	65	0	0	to	66	0	0
Gallic, pure	lb.	0	2	11	to	0	3	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	40	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	45	0	0
Nitric, 80 Tw.	ton	30	0	0	to	31	0	0
Oxalic	lb.	0	0	8¼	to	0	0	8½
Phosphoric, 1.5	ton	38	0	0	to	40	0	0
Pyrogallic, cryst.	lb.	0	6	0	to	0	6	3
Salicylic, Technical	lb.	0	0	10½	to	0	1	0
Salicylic, B.P.	lb.	0	1	3	to	0	1	5
Sulphuric, 92–93%	ton	7	10	0	to	8	0	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	4½	to	0	1	4½
Alum, lump	ton	13	0	0	to	14	0	0
Alum, chrome	ton	28	0	0	to	29	0	0
Alumino ferric	ton	9	0	0	to	9	5	0
Aluminium, sulphate, 14–15%	ton	10	10	0	to	11	0	0
Aluminium, sulphate, 17–18%	ton	11	10	0	to	12	0	0
Ammonia, anhydrous	lb.	0	1	8	to	0	1	9
Ammonia, .880	ton	33	0	0	to	35	0	0
Ammonia, .920	ton	21	0	0	to	23	0	0
Ammonia, carbonate	lb.	0	0	4	to	0	0	4½
Ammonia, chloride	ton	60	0	0	to	65	0	0
Ammonia, muriate (galvanisers)	ton	35	0	0	to	37	10	0
Ammonia, nitrate (pure)	ton	35	0	0	to	40	0	0
Ammonia, phosphate	ton	74	0	0	to	75	0	0
Ammonia, sulphocyanide	lb.	0	1	10	to	0	2	0
Amyl acetate	ton	175	0	0	to	185	0	0

	Per	£	s.	d.		£	s.	d.
Arsenic, white, powdered	ton	42	0	0	to	44	0	0
Barium, carbonate, 92–94%	ton	12	10	0	to	13	0	0
Barium, Chlorate	ton	60	0	0	to	68	0	0
Barium Chloride	ton	19	10	0	to	20	0	0
Nitrate	ton	27	10	0	to	30	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	1	0	to	0	1	3
Bleaching powder, 35–37%	ton	12	0	0	to		—	
Borax crystals	ton	29	0	0	to	33	0	0
Calcium acetate, Brown	ton	9	0	0	to	9	10	0
" " Grey	ton	13	10	0	to	14	0	0
Calcium Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	6	10	0	to	7	0	0
Carbon bisulphide	ton	50	0	0	to	52	0	0
Casein, technical	ton	47	0	0	to	55	0	0
Cerium oxalate	lb.	0	4	6	to	0	4	9
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	2	to	0	1	3
Sulphate	ton	28	10	0	to	29	0	0
Cream Tartar, 98–100%	ton	115	0	0	to	117	10	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	68	10	0	to	70	0	0
Formusol (Rongalite)	lb.	0	2	6	to	0	2	9
Glauber salts, commercial	ton	5	10	0	to	6	0	0
Glycerine, crude	ton	70	0	0	to	72	0	0
Hydrogen peroxide, 12 vols.	gal.	0	2	5	to	0	2	6
Iron perchloride	ton	30	0	0	to	32	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	42	0	0	to	43	0	0
Carbonate (White Lead)	ton	42	0	0	to	46	0	0
Nitrate	ton	46	10	0	to	48	10	0
Litharge	ton	35	10	0	to	36	0	0
Lithopone, 30%	ton	25	10	0	to	26	0	0
Magnesium chloride	ton	10	0	0	to	10	10	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	8	0	0	to	8	10	0
Sulphate (Druggists')	ton	13	10	0	to	14	10	0
Manganese, Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	60	0	0	to	62	0	0
Methyl acetone	ton	60	0	0	to	65	0	0
Alcohol, 1% acetone	ton	65	10	0	to	66	0	0
Nickel sulphate, single salt	ton	49	0	0	to	51	0	0
Ammonium sulphate, double salt	ton	51	0	0	to	52	0	0
Potash, Caustic	ton	33	0	0	to	34	0	0
Potassium bichromate	lb.	0	0	6¾	to		—	
Carbonate, 90%	ton	31	0	0	to	33	0	0
Chloride, 80%	ton	12	0	0	to	12	10	0
Chlorate	lb.	0	0	4½	to	0	0	5
Meta bisulphite, 50–52%	ton	84	0	0	to	90	0	0
Nitrate, refined	ton	45	0	0	to	47	0	0
Permanganate	lb.	0	0	9	to	0	0	10
Prussiate, red	lb.	0	4	6	to	0	4	9
Prussiate, yellow	lb.	0	1	5	to	0	1	6
Sulphate, 90%	ton	13	0	0	to	13	10	0
Salammoniac, firsts	cwt.	3	3	0	to		—	
Seconds	cwt.	3	0	0	to		—	
Sodium acetate	ton	24	10	0	to	24	15	0
Arseniate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	5½	to		—	
Bisulphite, 60–62%	ton	23	0	0	to	24	0	0
Chlorate	lb.	0	0	3¾	to	0	0	4
Caustic, 70%	ton	20	10	0	to	21	0	0
Caustic, 76%	ton	21	10	0	to	22	10	0
Hydrosulphite, powder, 85%	lb.	0	1	9	to	0	2	0
Hyposulphite, commercial	ton	13	10	0	to	14	0	0
Sodium Nitrite, 96–98%	ton	31	0	0	to	32	0	0
Phosphate, crystal	ton	18	10	0	to	19	0	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	11	to	0	0	11½
Sulphide, crystals	ton	13	0	0	to	14	0	0
Sulphide, solid, 60–62%	ton	21	10	0	to	23	10	0
Sulphite, cryst.	ton	12	10	0	to	13	0	0
Strontium carbonate	ton	55	0	0	to	60	0	0
Strontium Nitrate	ton	50	0	0	to	55	0	0
Strontium Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Sulphur, Flowers	ton	13	0	0	to	14	0	0
Roll	ton	13	0	0	to	14	0	0
Tartar emetic	lb.	0	1	6	to	0	1	7
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	5	to	0	1	6
Zinc chloride 102° Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	36	0	0	to	38	0	0
Dust, 90%	ton	45	0	0	to	47	10	0
Sulphate	ton	18	10	0	to	19	10	0

Coal Tar Intermediates, &c.

	Per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	2	3	to	0	2	6
Alphanaphthol, refined	lb.	0	3	0	to	0	3	3
Alphanaphthylamine	lb.	0	2	0	to	0	2	1
Aniline oil, drums extra	lb.	0	1	0	to	0	1	1
Aniline salts	lb.	0	1	1	to	0	1	2
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	9	to	0	4	3
Benzidine, base	lb.	0	5	9	to	0	6	0
Benzidine, sulphate	lb.	0	5	9	to	0	6	0
Benzoic acid	lb.	0	1	7½	to	0	1	9
Benzoate of soda	lb.	0	1	6	to	0	1	7
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	4	9	to	0	5	0
Betanaphthol	lb.	0	1	4	to	0	1	4½
Betanaphthylamine, technical	lb.	0	6	0	to	0	7	0
Croceine Acid, 100% basis	lb.	0	3	6	to	0	3	9
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	2	9	to	0	3	0
Dinitrobenzol	lb.	0	1	3	to	0	1	4
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	5	to	0	1	6
Dinitrophenol	lb.	0	2	9	to	0	3	0
Dimethylaniline	lb.	0	2	3	to	0	2	6
Diphenylamine	lb.	0	4	3	to	0	4	6
H-Acid	lb.	0	6	6	to	0	7	0
Metaphenylenediamine	lb.	0	5	6	to	0	5	9
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	6	0	to	0	6	6½
Monosulphonic Acid (2.7)	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude	lb.	0	3	0	to	0	3	3
Naphthionate of Soda	lb.	0	3	0	to	0	3	3
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	9	to	0	8	0
Nitronaphthalene	lb.	0	1	4	to	0	1	5
Nitrotoluol	lb.	0	1	0	to	0	1	2
Orthoamidophenol, base	lb.	0	10	0	to	0	10	5
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	1	6	to	0	1	9
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	10	0	to	0	10	6
Para-amidophenol, hydrochlor	lb.	0	10	6	to	0	11	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	3	6	to	0	3	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	5	0	to	0	5	3
Paraphenylenediamine, distilled	lb.	0	10	6	to	0	10	9

Marshal Foch on Chemical Warfare

MARSHAL FOCH has written a preface to a French translation of Major Victor Lefebure's book on chemical warfare, *The Riddle of the Rhine*," which was reviewed in THE CHEMICAL AGE last October. He points out that the ever increasing capacity of the aeroplane to carry heavier weights will supply a fresh means of spreading poison gas by the aid of ever more powerful bombs and reaching armies and populations far to the rear. Chemical warfare, he continues, is thus able to produce more formidable results over greater expanses. On the other hand, it is beyond question that this extension finds a ready realisation in a country like Germany which devotes itself in peace time to the wholesale manufacture of chemical products which, by a slight modification of the process of reaction, can be converted into war products. Germany, at least partially deprived of her old method of fighting by a large military force, carefully instructed, regularly organised, and powerfully armed, may well turn to the new methods of attack which chemical warfare offer. Chemical warfare ought therefore to enter into our calculations and our preparations for the future, if we wish to avoid a formidable surprise. Marshal Foch regards the work of Major Lefebure as giving an exact idea of the possibilities which chemical warfare holds for Germany to-day, and, for that reason, of the danger which menaces France and Great Britain.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

GLASGOW, JUNE 21, 1922.

NUMEROUS inquiries continue to be received but the actual number of orders booked is poor in comparison.

Prices are on about the same level as last week, with the exception of acetic acid, which shows an upward tendency.

Industrial Chemicals

ACETONE.—The market has firmed up and prices of £65 to £70 quoted, according to delivery.

ACID ACETIC.—Glacial 98/100% quoted £63 to £65 per ton; 80% B.P., £44; 80% Technical, £40 to £41.

ACID BORACIC.—Prices unchanged. Crystal or granulated, £60 per ton; powdered, £62 per ton.

ACID CARBOLIC.—Offered at 5¾d. per lb. f.o.b., packed in usual drums with over-kegs.

ACID FORMIC, 80%.—Moderate demand. £65 to £66 per ton.

ACID HYDROCHLORIC.—Price unchanged. 6s. 6d. per carboy, ex works. A few inquiries for export.

ACID NITRIC, 80%.—In little demand. £25 to £26 ex works.

ACID SULPHURIC.—144°, £4 per ton; 168°, £7 5s. per ton. De-arsenicated quality, £1 more.

ACID CITRIC.—Quoted 2s. 6d. to 2s. 8d. per lb.

ALUMINA SULPHATE.—17/18% about £11 per ton; 14/15%, £9 per ton.

ALUM, LUMP POTASH.—Spot lots, £15 5s., ex store. Continental offers of £12 c.i.f.

AMMONIA, ANHYDROUS.—Moderate inquiry. Makers quote 1s. 10d. per lb.

AMMONIA CARBONATE.—A few inquiries for export; 4d. to 4¼d. per lb.

AMMONIA MURIATE, GREY.—Price £34 per ton f.o.r.

AMMONIA, SALAMMONIAC (CRYSTALS).—Price about £58 per ton.

AMMONIA SULPHATE.—25¼%, £15 10s. per ton; 25¾% neutral, £16 13s. per ton, ex works. June delivery.

ARSENIC, WHITE POWDERED.—In moderate request. £44 per ton, ex store.

BARIUM CARBONATE (PRECIPITATED).—Quoted £13 per ton, f.o.b. U.K.

BARIUM CHLORIDE.—Good demand for export. £21 per ton, f.o.b. Spot lots to be had at £19 10s. per ton.

BLEACHING POWDER.—Makers advise reduction in price of £1 per ton for second half of year. Spot lots still £14, ex station.

BORAX.—Price unchanged. Crystal or granulated, £29 per ton; powdered, £30 per ton.

CALCIUM CHLORIDE.—£6 10s. per ton, ex quay. Continental offers of £6, c.i.f.

COPPER SULPHATE.—about £28 per ton ex quay, for prompt delivery.

COPPERAS, GREEN.—£3 15s. per ton, ex works, in full loads.

FORMALDEHYDE, 40%.—In little demand. Offered at £66 to £67 per ton.

GLAUBER SALTS.—Spot lots of fine crystals, £5 per ton ex store.

LEAD.—Red: Makers advise advance of £1 per ton. Price now £37 10s. delivered; White remains unchanged, £50 10s. per ton.

MAGNESITE.—Finest ground calcined, £12 10s. ex store; coarser quality, £10 ex store.

MAGNESIUM CHLORIDE.—Spot lots offered at £7 15s. ex store. Continental offers of £6 per ton, c.i.f.

MAGNESIUM SULPHATE (Epsom Salts).—Commercial quality, £7 10s. per ton; B.P., £9 15s. delivered.

POTASSIUM BICHROMATE.—Makers' price unchanged, 6¾d. per lb. A few export inquiries.

POTASSIUM CARBONATE, 96/98%.—Continental make for June shipment offered at £30 c.i.f.

POTASSIUM CAUSTIC, 88/90%.—Spot lots £33 per ton ex store. Cheap Continental offers of £29 per ton c.i.f.

POTASSIUM CHLORATE.—Quoted 4¾d. per lb. delivered.

POTTASSIUM NITRATE.—Spot lots £35 per ton ex store.

POTASSIUM PERMANGANATE.—Pure crystals quoted 10½d. to 10¾d. per lb. ex station.

POTASSIUM SULPHATE, 90%.—£15 per ton.

SODIUM ACETATE.—Quoted £24 to £24 10s. per ton for spot delivery.

SODIUM BICARBONATE.—Unchanged, £11 per ton ex quay or station; m.w. quality £10 per ton.

SODIUM BICHROMATE.—Makers' price unchanged at 5¼d. per lb. delivered.

SODIUM CARBONATE.—Soda Crystals, £6 per ton ex quay or station; Alkali 98%, £9 12s. 6d. per ton ex quay or station.

SODIUM CAUSTIC.—Makers advise reduction in prices of £2 for second half of year. Spot prices still—76/77%, £25 10s.; 70/72%, £23 10s.; 60%, £26 5s.; 98/99%, powdered, £29/30 per ton.

SODIUM HYPOSULPHITE.—Commercial crystals, £14 10s. ex store; pea crystals, £20 10s.; commercial, for export, quoted £13 10s. per ton f.o.b.

SODIUM NITRATE.—£14 15s. per ton f.o.r. or f.o.b. Refined, 5s. per ton more.

SODIUM NITRITE, 100%.—£31 per ton.

SODIUM SILICATE, 140°.—In poor demand. £10 to £11 per ton ex station.

SODIUM SULPHATE (Saltcake, 95%).—A few export inquiries. Price £4 per ton f.o.b.

SODIUM SULPHIDE, 60/62%.—Cheap Continental offers of £18 per ton c.i.f. U.K.

SULPHUR.—Government stocks of Sicilian thirds available at £4 5s. to £4 15s. per ton, according to quantity.

WAX.—American White Scale, 122/124°, is offered at 1⅞d. per lb. ex store, for spot delivery and 1¾d. per lb. for forward delivery.

ZINC DUST, 90/94%.—English make offered at £46 to £47 per ton.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Poducts

BENZOL.—Supplies of both crude and pure are still coming on to the market and prices are inclined to be lower.

METAPHENYLENEDIAMINE.—Export inquiries. Price quoted 6s. per lb. f.o.b., casks included.

MONOCHLORBENZOL.—Export inquiry. Price quoted, £80 per ton, f.o.b.

ORTHO AMIDO PHENOL.—Small home inquiry. Price quoted, 12s. 6d. per lb. delivered.

PARANITROCHLORBENZOL.—Home inquiry. Price 1s. per lb. delivered.

PARANITROPHENOL.—Some export inquiries. Price quoted, 2s. 2d. per lb. on 100% basis, f.o.b. English port.

The British Association of Chemists

IT is announced that a special general meeting of the British Association of Chemists will be held on July 8, at 3 p.m., at the Midland Hotel, Manchester, for confirmation of the Advisory Ballot on the Unemployment Benefit Scheme and for its formal adoption as part of the Rules of the Association. In the unavoidable absence of the President, the chair will be taken by Mr. W. E. Kay, Chairman of Council, who will move: "That this Meeting confirms the result of the ballot on the Unemployment Benefit Fund Scheme and hereby authorises the Council to proceed with its registration as an addition to the Rules of the Association. That the Rules for the Unemployment Benefit Fund be put into immediate operation, and that subscriptions to the fund be payable as from July 1, 1922." No other business will be transacted at this meeting, but an opportunity will be given for general discussion of the work of the Association. The result of the Advisory Ballot was as follows: In favour of scheme, 517; against adoption, 126; against continuing membership if adopted, 37; votes disqualified and no expression of opinion, 17. Percentage of members voting, 74 per cent.; percentage of members voting in favour, 60 per cent.; percentage of members voting against, 14 per cent.

German Chemical Trade Notes

FROM OUR OWN CORRESPONDENT.

Berlin, June 19, 1922.

THE situation on the market of industrial chemicals remains unchanged. As indicated in my last report, the German chemical industry is in urgent need of glassware. To cope with this heavy demand, considerable orders have been placed in England.

The German advantage in the matter of low prices seems to be dwindling, and it is even reported that foreign competition is felt in branches of the trade where in former times Germany had a monopoly, at least on her own domestic market.

Paint materials have been meeting with increased interest from buyers, and zinc white, white lead and red lead were willingly taken up at rising quotations on spot; a fair business is also to be noted on forward contracts. Citric and tartaric acids continue to be in good demand. The past week has been a quiet one for pharmaceutical products, and has been subject to a considerable diminution.

On the Upper Silesian market tar products show signs of improvement. Whereas crude tar shows no noticeable change, tar oils, recently freely offered, are now scarce and dear. As regards exports, considerable sales have been made for the Eastern (Baltic) and South-Eastern (Czecho-Slovakian, Jugoslavian, etc.) States.

The following quotations are given in marks per kilogram (d.=domestic price; e.=export price):—

ACIDS: Acetic, 80%, demand exceeded supplies at 58/60 mk. d.; glacial, 98/100%, very scarce for export at 75 mk. e.; 70 d. Acetyl-Salicylic, 300 mk. d.; 350 mk. e. Benzoic, neglected at 185 mk. d.; 200/220 mk. e. Boric, crystallised, 76 mk. d.; 78/82 mk. e. Citric, 330 mk. d.; 320 mk. e. Formic, 85% technical, the Convention have advanced their prices; demand is strong, and the trade price is 32/33 mk. d. Oxalic, 40 mk. d.; 70/75 mk. e. Salicylic, advanced to 165/180 mk. d.; 190/210 mk. e. Tartaric, powdered and crystallised, in strong demand at 180 mk. d.; 200 mk. e.

INDUSTRIAL CHEMICALS: Alum, Chrome, 15%, 34/36 mk. d.; in fair request for export at 38/40 mk. e. Potash, crystal powder, neglected at 8.50/9.50 mk. d.; 12/12.50 mk. e.; Potash, in lumps, 12.25 mk. d.; 13.50/16 mk. e. Alumina Sulphate, 14/15 %, 6.75 mk. d.; 8.75 mk. e.; 17/18%, 11 mk. e. Ammonia Carbonate, in good demand at 21 mk. d.; 34/36 mk. e. for powdered goods; in lumps, 30 mk. d.; 45 mk. e. Barium Chloride, in good request at 22.50 mk. d.; 25 mk. e. Bleaching Powder, in strong demand at 7.50 mk. d.; scarce for export at 14.25 mk. Bone Glue, transparent, 63 mk. d. Borax, crystallised, 40/41 mk. d. Calcium Carbonate, in fair request at 13 mk. d.; 17 mk. e. Calcium Chloride, 70/75%, 6.15 mk. d.; 6 mk. e. Copperas, 5.50/6 mk. d.; 6.50 mk. e. Copper Sulphate, 98/100%, neglected at 38/40 mk. d.; 40/42 mk. e. Cream of Tartar, 98/100%, 135 mk. d., tendency firm. Dextrine, in fair demand, with short supplies at 35 mk. d. Epsom Salt, 3 mk. d.; 5 mk. e. Formaldehyde, 30%, 69 mk. e.; 40%, 80 mk. d.; 87 mk. e. Glauber's Salt, crystallised, 3 mk. d.; 4 mk. e. Glycerine, 28° Bé., 95 mk. d.; 100 mk. e. Lead, red, 44 mk. d.; 46 mk. e.; white, powdered, 40 mk. d.; 42 mk. e.; in oil, 44.50 mk. d.; 47 mk. e. Sugar of Lead, 44/46 mk. d.; 48 mk. e. Litharge, 45 mk. d.; 47 mk. e. Lithopone, Red Seal, in better demand at 19.75 mk. d.; 25/26 mk. e. Magnesium Chloride, fused, is unchanged at 2.25 mk. d.; 6.50 mk. e. Potassium Bichromate, 63 mk. d.; 79/83 mk. e. Potassium Carbonate, 98/100%, 28.50/32 mk. d.; in fair request for export at 40/42 mk. Potash, Caustic, 28.50 mk. d.; 37.50 mk. e.; liquor, 13.50 mk. d. Potassium Chlorate, in good demand for export at 37/39 mk.; 32 mk. d. Potassium Metabisulphite, 65 mk. d., supplies scarce. Potassium Permanganate, 75/80 mk. d; 78/85 mk. e. Potassium Prussiate, yellow, 175 mk. d.; red, small parcels are offered at 425 mk. d. Potash, saltpetre, 34.50 mk. d. Salt Cake, loose, 5 mk. d.; 6.50 mk. e. Soda, crystallised, 7.75 mk. d.; 8/8.25 mk. e. Soda Ash, 14.25 mk. d.; 12.75 mk. e. Sodium Benzoate, in fair demand at 200 mk. d. and e. Sodium Bicarbonate, 9 mk. d.; 17 mk. e. Sodium Bichromate has declined to 56 mk. d.; 62 mk. e. Soda Caustic, 28.50 mk. d.; 26 mk. e.; liquor, 13/14 mk. d. Sodium Hyposulphite, crystallised, 12 mk. d.; 15 mk. e.; pea form, 14 mk. d.; 18.50 mk. e. Sodium Salicylate, very scarce at 180 mk. d.; 220 mk. e. Sodium Silicate, 38/40 Bé., 6.50 mk. e. Sodium Sulphide, 30/32%, neglected at 10/11 mk. d.; 12/13 mk. e.; 60/62%, 23 mk. d.; in good demand for export at 24/26 mk. Skin Glue, A1 quality, 78 mk. d. Strong Glue, 63 mk. d. Zinc Chloride, 98/100%, 24 mk. d., 26 mk. e. Zinc White, red seal is offered at 50 mk. d.; 53 mk. e.; green seal can be had at 57 mk. d.; 60 mk. e.

The Nitrate Market

REPORTING on the nitrate market under date of June 19, Aikman (London), Ltd., state that since June 6 the arrivals amount to only about 5,000 tons, and about 1,000 tons are due during the next fortnight. The market has been more active during the past fortnight, with a considerable improvement in spot demand, and the "pool" sales have amounted to nearly 50,000 tons. The price of spot is quoted about £13 to £13 10s. per ton, and as new nitrate bought from the association at the lower scale of prices cannot reach consuming markets before late August-September, firm prices are likely to be maintained by the "pool" till then. For later delivery, quotations are about £11 5s. for September, ranging up to £12 10s. per ton delivered for spring delivery, with a fair demand. Sales of quotas for July, 1922-June, 1923, are reported from Valparaiso at 9d. per quintal, closing with buyers thereat and sellers at 10d. In the London market 10d. per quintal has been paid.

Prices of sulphate of ammonia are unchanged.

Production and Uses of Chemical Lime

"CHEMICAL LIME" is the title of an interesting 32-page booklet recently published by the Callow Rock Lime Co., Ltd. The first portion of the pamphlet details in a very concise manner with the history, production, uses, etc., of chemical lime and furnishes a great deal of useful information on lime which is probably printed for the first time. The historical section traces the lime industry back to the time of the ancient Egyptians, proof of its existence being furnished by the elder Pliny and Dioscorides. In spite of the antiquity of the industry the change which occurs in the "burning" of limestone was attributed, up to the latter part of the eighteenth century, to the entrance of phlogiston into the stone. Dealing with the importance of the physical condition of lime the booklet points out that as in certain processes it is necessary to settle out the carbonate of lime formed from a reaction in which lime takes part, alumina and iron, which tend to remain in suspension, are undesirable impurities when such a use is contemplated. The relative merits of calcium oxide, milk of lime, quicklime and hydrated lime are discussed in favour of the last-mentioned. A description of old and new methods of hydration and an account of the industrial uses of lime complete the first portion. The second part deals more particularly with Callow Rock lime and gives an account of the methods used in its production, its physical and chemical properties, and a comparison of its composition and properties with those of other limes. The company inform us that all the analyses, etc., which are quoted in the booklet are on average samples of the material as it is actually dispatched, and that readers of THE CHEMICAL AGE may obtain copies free on application to their head offices, at 810-811, Salisbury House, London.

Receivers for the Cape Copper Co.

IN the Chancery Division, on Tuesday, before Mr. Justice Romer, Mr. Hughes, K.C., on behalf of Lloyds Bank City Offices Nominees, Ltd., moved for the appointment of two named gentlemen as receivers of the Cape Copper Co., Ltd. Mr. Hughes stated that the plaintiff company were a subsidiary company of Lloyds Bank Ltd., and was a large holder of debentures in the defendant company, which had been in existence since 1866. It had been very successful in the past, but unfortunately had now got into trouble. It owned properties at Briton Ferry, South Wales, and in South Africa and India, but was unable now to work them at a profit. The total debenture issue was £420,000, of which the plaintiff company held £300,000 by way of security. The interest was in arrears and the debentures had become payable, but it was also a case of jeopardy. Counsel asked that the receivers should be allowed to act at once, and to have liberty to borrow £500, as the company had not enough money to pay wages. Mr. Cohen, for the company, said he was not in a position to resist the application. Money was urgently required. His Lordship appointed the receivers, gave them liberty to borrow £500 at once, and said they could apply in Chambers if further sums were required.

Company News

NIGER CO., LTD.—The transfer books of the 5 per cent. debenture stock are closed until July 1.

CAPE EXPLOSIVE WORKS.—The transfer books of the first mortgage debenture stock are closed until June 30.

BENN BROTHERS, LTD.—The usual second interim dividend at the rate of 2½ per cent. per annum is payable on July 1.

BRYANT AND MAY, LTD.—The transfer books of the 4 per cent. debenture stock and the 7½ per cent. five-year notes are closed until June 30.

PARKE'S DRUG STORES.—A further dividend of 2½ per cent. less tax is declared on the ordinary shares for the half-year to February 28, making 7½ per cent. for the year.

NEW TAMARUGUL NITRATE CO.—An interim dividend of 5 per cent. (1s. per share), less tax, is payable on July 18. The transfer books will be closed from July 4 to 17 inclusive.

WILLIAM GOSSAGE AND SONS.—The transfer books of the 6½ per cent. cumulative preference shares are closed until June 30, for the preparation and issue of dividend warrants.

UNITED ALKALI CO., LTD.—Pending the issue of the accounts for 1921, the directors have decided to pay 13 per cent. of arrears outstanding on the cumulative preference shares (6s. per share, less tax).

MAJOR AND CO., LTD.—The balance of profit for 1921 was £15,315. The directors recommend a further dividend of 4½ per cent. on the preferred ordinary shares, making 8 per cent. for the year, and a dividend of 10 per cent. on the ordinary shares, carrying forward £2,140.

BRITISH ALUMINIUM CO., LTD.—The transfer books of the 5 per cent. prior lien debentures are closed until June 30 for the payment of the six months' interest due on July 1. Coupons are payable at the London County, Westminster and Parr's Bank, Ltd., 52, Threadneedle Street, London.

BRITISH SOUTH AFRICAN EXPLOSIVES CO.—The net profit for 1921 after paying taxes and writing off to the value of £26,659, amounted to £33,924 (against £50,439). With the amount brought forward the available profit is £111,077. It is proposed to pay a dividend of 10 per cent. (the same) to-day (Saturday).

BRUNNER, MOND AND CO., LTD.—Proposing the payment of the ordinary dividend at the rate of 8 per cent. per annum, less income tax, Mr. Roscoe Brunner, at the annual meeting, said the debts owing to the company were up by £387,000. During the year they had advanced a great deal more than that figure to their subsidiary company, Synthetic Ammonia and Nitrates, Ltd.; deducting this advance, the idebts owing were less than last year's. An account of the chairman's speech appears on another page.

BLEACHERS' ASSOCIATION, LTD.—Presiding at the annual meeting on Tuesday, Sir Alan J. Sykes said the figures for the year were very satisfactory. There was a total available balance of £991,778, compared with £835,996 a year ago. After paying dividend on the preference shares, and a transfer of £125,000 to general reserve, the directors further recommended a dividend on the ordinary shares of 10 per cent. (actual) for the half year ended March 31 last, making with the interim dividend paid in December last, 12½ per cent. for the year, against 10 per cent. last year; £359,405 remained to be carried forward.

ANGLO-EGYPTIAN OILFIELDS.—The report for 1921 states that the net profit, after making the usual provision for depreciation on property, as well as a special provision for exploration expenses, amounts to £374,836, and £146,003 was brought in, making £520,839. The directors recommend that £280,944 be applied to payment of dividends on the respective classes of shares, leaving £239,895 to be carried forward, subject to taxation. The proportion of the profits allotted, in accordance with the articles of association to the "B" shares, allows for payment of a dividend equal to 15 per cent. upon the "B" shares capital, less tax. Dividend warrants will be posted on June 28. The transfer books are closed until June 28. The annual meeting will be held at Winchester House, London, on June 28, at noon.

BENZOL AND BY-PRODUCTS, LTD.—The report for the period from September 1, 1920 to March 31, 1921, states that after deducting all expenses, there is a credit to the profit and loss account of £39,903, and £7,813 was brought in, making £47,716. Setting aside £8,000 additional provision for income tax, excess profits duty, and corporation tax, and writing off £4,940 underwriting and overriding commission, leaves a balance of £34,776 net profit. From this there have been paid the second preference dividend to March 3, 1921, absorbing £14,944, and an ordinary dividend at the rate of 5 per cent. to March 31, 1921, absorbing £12,631, both amounts including income tax. After payment of these dividends there remains a balance of £7,201, which has been carried forward. The annual meeting will be held at 16, Grosvenor Place, London, on June 28, at 12.15.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OR FIRM OR AGENT.	MATERIAL.	REF. No.
U.S.A.	Sulphate of ammonia, etc. ..	667
U.S.A.	Linseed oil, caustic soda, soda ash	669
Argentine ..	Heavy chemicals	—
Chile	Drugs	670
U.S. America ..	Fertilisers	667
U.S. America ..	Linseed Oil, Caustic Soda and Soda Ash	669
Chile	Pharmaceutical Preparations and Drugs	670
Sydney ..	Chemists' and Druggists' Requirements	690
Sydney ..	Eucalyptus oil	691
Melbourne ..	Chemists' supplies	412/20/7/3046
Antwerp ..	Fine chemicals, drugs, pharmaceutical products, etc. ..	701
New York ..	Citric acid, drugs, etc.	—

Tariff Changes

BELGIUM.—New regulations relating to the sale of disinfectants and antiseptics in Belgium will come into force on October 1.

EGYPT.—Restrictions regarding the importation of glucose were published in the *Board of Trade Journal* of June 15 (p. 671).

SPAIN.—Until the provisions of the new Tariff relating to the assessment of *ad valorem* duties are put into operation, invoices for goods subject to *ad valorem* duties may be made out in pesetas or in the currency of the country of production.

TUNIS.—The exportation of crude methyl alcohol, rectified methyl alcohol, acetone and charcoal is permitted without special authorisation.

CANADA.—Proposed amendments in the import duties were published in the *Board of Trade Journal* of June 15 (p. 673). A number of chemicals, glass carboys, etc., are affected.

Institution of Chemical Engineers

A MEETING of the Selection Committee of the Institution of Chemical Engineers was held on May 17, at 116, Piccadilly, London. Messrs. F. H. Rogers, Professor J. W. Hinchley, Dr. E. W. Smith, and A. C. Flint were present. It was not considered desirable that application forms other than Membership and Associate-membership should be drafted at present. It was agreed that the more difficult question relating to the election of "Graduates" and "Students" should be dealt with by the first Council, when appointed. The draft application form for Membership and Associate-membership was submitted by Professor Hinchley. A lengthy discussion took place and many amendments were made. It was agreed that the form should again be submitted to the members of the Selection Committee. If approved by all the members, the final draft would be submitted to the Provisional Committee for adoption.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

BABER, T., 518A, London Road, Sheffield, chemist, £18 10s. 4d. April 6.

GILES, Nicholas, 165, Great Howard Street, Liverpool, wholesale druggist, £14 19s. 9d. April 25.

LLEWELLYN, Willie, Dunraven Street, Tonypandy, chemist, £10 11s. 6d. April 21.

MANSELL, Albert Irwin, 35, Hampstead Road, N.W., chemist, £21 10s. 7d. and £11 13s. April 12.

STANSFIELD, J. L., Boothfold, Waterfoot, chemical manufacturer, £17 10s. April 11.

ROBARTES, LTD., Diadem House, Leather Lane, E.C., chemists, £17 12s. 8d. April 5.

WEBB, J., AND SON, 42, Upper Tulse Hill, S.W., dyers and cleaners, £14 3s. 10d. April 11.

Receivership

DONALD LOCKWOOD AND CO., LTD.—B. Hennell, of 165/7, Moorgate, London, was appointed receiver and manager on June 2, under powers contained in debentures dated January 6, 1922.

Mortgages and Charges

[*NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.*]

BRITON FERRY CHEMICAL AND MANURE CO., LTD.—Registered June 9, under lease by way of mortgage (supplemental to Trust Deed registered May 4, 1921, securing £150,000 debenture stock); charged on land at Llansamlet: also registered June 9, assignment (supplemental to Trust Deed as above); charged on an agreement relating to the carrying on of the business of manufacture and sale of sulphuric acid and for division of profits. *£130,000. March 28, 1922.

ELTON COP DYEING CO., LTD.—Registered June 7, £40,000 debentures, present issue £23,481 5s. 7d.; general charge. *£111,027 14s. 4d. November 15, 1921.

HOLLOWAY (GEORGE T.) AND CO., LTD., London, E., metallurgists, etc.—Registered June 9, £250, £200, £50, and £500 debentures part of £5,000; general charge. *——. January 12, 1912.

RADIUM AND CHEMICAL CO., LTD., London, E.C.—Registered June 9, £25,000 debentures, present issue, £10,000; general charge. *£1,500. February 24, 1922.

London Gazette

Companies Winding up Voluntarily

BRITEX CHEMICAL PRODUCTS CO., LTD. D. Haslett, 26, Audrey House, Ely Place, London, appointed liquidator. Meeting of creditors at the liquidator's office, on Thursday, June 22, at 11 a.m. NOTE.—This notice is merely formal to comply with the Companies Act, as all creditors have been or will be paid in full.

Company Winding Up

ALBY UNITED CARBIDE FACTORIES LTD. Registered Office, Winchester House, Old Broad Street, in the City of London. First meetings, June 30. Bankruptcy Buildings, Carey Street, Lincoln's Inn, London, W.C.2. Creditors, 11.30 a.m.; contributories, 12.30 p.m.

Order Made on Application for Discharge

ASHCROFT, Frank, in co-partnership with LEWIS, H. T., under the style of LEWIS AND CO., at 176, Moss Lane East, Manchester, and 5, Chapman Street, Hulme, Manchester, manufacturing chemist. Order made, May 10. Discharge of the debtor granted forthwith.

Bankruptcy Information

PRESCOTT, Alfred, carrying on business as PRESCOTT AND CO., Rutland Mills, Oswald Street, Hulme, Manchester, Drake Street, Manchester, Holt Town, Manchester, and Mill Bank Chemical Works, Triangle, Halifax, chemical and aniline dye manufacturer. Receiving Order, June 13. Creditor's petition.

Liquidators' Notices

HOLBORN GLASS WORKS, LTD. Meeting of creditors at the Works of the Company, West Holborn, South Shields, on June 27, at 3 p.m.

GLARO METAL POLISH CO., LTD. (in voluntary liquidation). Meeting of creditors at the office of C. L. Townend, 41, Commercial Street, Halifax, on Thursday, June 22, at 11.30 a.m.

Notice of Intended Dividend

SMITH, Henry, Batley, co. York (trading under the style of HENRY SMITH AND CO.), chemist, druggist, etc. Last day for receiving proofs, July 1. Trustee, W. Durrance, 12, Duke Street, Bradford.

Notice of Dividend

AINLEY, Edward Theodore, Woolhall Street, Bury St. Edmunds, Suffolk, chemist. Amount per £, 17s. 0½d., supplemental. Payable June 22, 5, Butter Market, Ipswich.

Edinburgh Gazette

REID, R. A., AND CO., LTD. Company to be wound up voluntarily. J. G. Carruthers, 125, Buchanan Street, Glasgow, appointed liquidator. Meeting of creditors at liquidator's office, on Tuesday, June 27, at 12 noon. NOTE.—The above notice is given to comply with the provisions of the Companies (Consolidation) Act. All the creditors have been or will be paid in full.

Why Dr. Levinstein Resigned

(Explanation to Members of Parliament)

AT a meeting of the Commercial Committee of the House of Commons on Wednesday, Dr. Levinstein, who recently retired from the board of the British Dyestuffs Corporation, Ltd., made a statement on his reasons for this action. Dr. Levinstein said he had resigned from the company entirely on grounds of public policy, and no personal issues were involved. It was entirely on account of his objection to the appointment of gentlemen to the control of the business who had no technical knowledge of chemistry or of the dye industry. The British Dyestuffs Corporation had been since its formation directed and controlled by the Government, acting through the Government directors. Some people thought that by the acquisition of so-called German "secrets" we should secure a British dyestuffs industry. The strength, however, of the German position lay not in these "secrets," but in the scientific organisation which produced them, knew how to exploit them, and which would go on producing new "secrets." The only counter move was to be as strong technically, and as efficient. There was no short cut. There were four things which should be secured from the British dyestuffs industry: (1) The economic freedom of our textile and other dye-consuming trades. (2) Security against chemical warfare attacks. (3) The discovery and development of new industries dependent on invention in organic chemistry. (4) A counter to the peaceful penetration by Germany of the native races of India and the East secured by their monopoly of the up-country business with tons of dyestuffs. For each of these reasons they must have large factories and do a world's business, and not a business confined to Great Britain.